Department of Environmental Quality

To protect, conserve, and enhance the quality of Wyoming's environment for the benefit of current and future generations

Matthew H. Mead, Governor

Todd Parfitt, Director

April 2, 2015

Mr. Randall Atkins
RAMACO Wyoming Coal Company, Inc.
1101 Sugarview Drive
Sheridan, WY 82801

RE: Round 1 Technical Review, Brook Mine Coal Mine Permit Application, TFN 6 6/025

Dear : Mr. Atkins

The Land Quality Division received your application for a Permit to Mine Coal on October 30, 2014 and it was reviewed for technical completeness on the same day. On November 4, 2014 the application was deemed technically complete. The document has now been reviewed in its entirety and comments, questions, noteworthy deficiencies, and requests for additional information were generated. These have been gathered by the permit coordinator and are presented as attachments to this letter.

There are a large number of comments in this first round due to the nature of the permit application. The permitting process has become more refined since the last coal mining permit was issued in Wyoming and reviews today have a greater degree of sophistication. In some cases, different reviewers have similar comments in areas where their reviews overlap. These were reviewed by the permit coordinator and modified to be less duplicative, where possible.

Please review the First Round evaluation comments and prepare your replies accordingly. When you have completed the Round I assessment of our commentaries, send your responses to the LQD office in Sheridan to begin the Round II Technical Evaluation. Contact Bj Kristiansen or Mark Rogaczewski with questions or requests for clarification of the Round I materials. We will be happy to assist you in this process.

Sincerely,

Bjarne Kristiansen, PG
Natural Resources Program Principal
WDEQ-LQD District III

Brook 23

Cc: Cheyenne LQD files

2100 West 5th Street · Sheridan, WY 82801
(307) 673-9337 · FAX (307) 672-2213

4/2/15

MEMORANDUM

TO: File, Brook Mine Permit Application, TFN 6 6/025

RE: Comments on ADJUDICATION, B.H.C. 1-3, Warranty Deed, July 27, 1954

FROM: Wyoming Attorney General's Office

DATE: April 1, 2015

The Land Quality Division has determined that this Application is deficient and is not yet technically adequate and suitable for publication regarding the requirements of Wyoming Statutes § 35-11-406(a)(ii) and (b)(xi)-(xii), and Chapter 2, Section 2 of the Division's rules and regulations for coal operations. In order for the Division to determine whether the Application meets these requirements, the Division needs the Applicant to address the following issues:

1. On March 9, 2015, the Division received a letter from attorney, Lynne Boomgaarden, on behalf of her client, Big Horn Coal Company. The letter described Big Horn Coal Company's concerns with the Application. Near the bottom of the second page, the letter states: "The extent of Brook Mining's right to use BHC surface lands under the 1954 deed currently is being litigated pursuant to a Declaratory Judgment Complaint filed by Brook Mining in *Brook Mining Company, LLC v. Big Horn Coal Company*, Civil Action No. CV 2014-372, and will be determined by the Fourth Judicial District Court for Sheridan County, Wyoming." A copy of that letter is included with these comments.

Chapter 2, Section 2(a)(iii) of the Division's coal rules states, "The right of entry statements and documents required by W.S. § 35-11-406(a)(ii) and (b)(xi) shall clearly explain and support the legal rights claimed by the applicant and shall also include whether that right is the subject of pending litigation[.]" In the spirit of that provision, the Division asks the Applicant to provide information about the case referenced in Big Horn Coal Company's letter and any similar pending litigation. At a minimum, the Division requests a summary of the circumstances that led to the case, the factual and legal questions at issue, and the case's current status. Please also provide copies of the complaint and the answer. If there are any motions that the court has ruled on limiting or deciding any of the claims or factual or legal questions originally at issue in the case, please also provide copies of the orders, the motions, the responses to the motions, and any supporting memoranda.

2. The Adjudication section of the Application includes copies of the deeds and surface access agreements and consent forms that the Applicant believes satisfy the requirements of W.S. § 35-11-406(a)(ii) and (b)(xi)-(xii), and Chapter 2, Section 2(a) of the Division's rules. However, the Application does not contain access agreements or consent forms for two surface owners within the permit area, Padlock Ranch Company and Big Horn Coal Company. In order to determine the Application's compliance with the statutory and regulatory requirements, the Division needs to be able to determine whether W.S. §§ 35-11-406(b)(xi) or -406(b)(xii) apply to this Application. Therefore, the Division requests the Applicant to provide sufficient information and supporting documents for the Division to determine whether Padlock Ranch Company and Big Horn Coal Company are or are not "residential or agricultural landowners" under the statutory definition in W.S. § 35-11-406(b)(xi).

6 2/025

MR KM DE SP
KR BK LM JM
PS MB DM DS
JJ DL

CROWLEY | FLECK
ATTORNEYS

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March 6, 2015

Department of Environmental Quality
Land Quality Division
Attn: Mr. Alan Edwards, Deputy Director and Acting Administrator
122 West 25th Street
Herschler Building
Cheyenne, WY 82002

Re: Concerns Regarding Brook Mining Mine Permit Application and Exploratory Drilling Activity within Big Horn Coal Co. Mine Permit Area: Permit No. 213-T8

Dear Mr. Edwards:

As you are aware, Brook Mining Company, LLC ("Brook Mining")[1] submitted an application for a permit to mine, TFN # 62/025, to the Land Quality Division of the Wyoming Department of Environmental Quality ("DEQ/LQD") on October 31, 2014 ("Brook Mining Application"). My client, Big Horn Coal Company ("BHC")[2], did not consent to the mine plan and reclamation plan that Brook Mining provided to BHC for review because the proposed activities will unreasonably interfere with BHC's extensive surface infrastructure improvements and its existing use and development plans for the area, including but not limited to the exercise of BHC's rights and obligations under its ***existing*** Mine Permit No. 213-T8. As you are also aware, Brook Mining, through its agents, representatives and/or contractors, has recently undertaken drilling activity pursuant to a Coal Notification on surface lands owned by BHC in the N1/2N1/2, Section 21, Township 57 North, Range 84 West. BHC was never notified of, did not consent, and, due to its regulatory obligations under Mine Permit No. 213-T8, strenuously objects to any and all such activity without at least having been provided notice and a plan of operations. This letter serves to document BHC's legal

[1] Brook Mining is the developer and operator of coal and coal mining interests owned by Ramaco Wyoming Coal Co., LLC ("Ramaco").

[2] BHC is wholly owned by AE Coal, LLC and AE Coal LLC is wholly owned by Ambre Energy North America, Inc.

and operational concerns with the Brook Mining mine plan, reclamation plan, permit application adjudication and exploratory drilling activity.

Background

Prior to submission of the Brook Mining Application, AE Coal, LLC, was party to an exploration agreement with Ramaco. That exploration agreement, together with all associated permissions for Ramaco to conduct pilot hole and core drilling and other related mineral exploratory and coal prospecting activities on BHC surface lands, expired by its own terms on July 19, 2014. Also prior to submission of the Brook Mining Application, on March 13, 2013, BHC consented to Ramaco conducting baseline environmental studies and surveys on certain BHC surface lands. Notwithstanding the March 2013 Landowner's Consent Agreement, on April 9, 2013, Ramaco sent a letter to BHC declaring that a 1954 deed between its predecessors and BHC provides Ramaco "the legal right to access the surface land for core drilling, pre-permit monitoring or any other pre mining activities" without any additional approval or consent from BHC. This position starkly differed from Ramaco's course of conduct when submitting its Notice of Intent to Explore for Coal By Drilling to DEQ/LQD (Mr. Mark Taylor) on September 21, 2012, in which it referenced the now-expired July 19, 2012 exploration agreement between AE Coal, LLC and Ramaco.

BHC has expressed in writing to Brook Mining its general support of coal mining in the area and, specifically, its support for Brook Mining's proposed mining beneath BHC's surface lands located north of the Tongue River. However, on October 9, 2014, BHC sent a letter to Ramaco confirming that Ramaco's proposed activities on BHC lands south of the Tongue River do not conform to BHC's development plans, that BHC "does not consent to the mining and reclamation plan that is being proposed by the Brook Mine," and that BHC does not agree with Ramaco's assertion that it has the right under the 1954 deed to make reasonable use of BHC's surface lands for mine planning, mining and mine related facilities and activities without surface owner's consent. The extent of Brook Mining's right to use BHC surface lands under the 1954 deed currently is being litigated pursuant to a Declaratory Judgment Complaint filed by Brook Mining in *Brook Mining Company, LLC v. Big Horn Coal Company,* Civil Action No. CV 2014-372, and will be determined by the Fourth Judicial District Court for Sheridan County, Wyoming.[3]

[3] In its district court complaint, Brook Mining also reserved the right to condemn BHC's property, including its surface rail and bridge infrastructure. Brook Mining's apparent intent to condemn BHC's existing surface infrastructure is curiously inconsistent with the Brook Permit Application, which proposes to mine under the existing surface infrastructure, thereby rendering that valuable infrastructure useless.

BHC's Surface Owner Rights under W.S. 35-11-406(b)(xii)

DEQ/LQD has no authority to adjudicate property rights disputes. Conversely, the District Court's determination of Brook Mining's rights under the 1954 deed has no bearing on BHC's rights as a non-resident, non-agricultural landowner under W.S. § 35-11-406(b)(xii). Ramaco admitted this point in its letter to Ambre Energy dated April 9, 2013, wherein Randall W. Atkins, Ramaco CEO, asserted Ramaco's rights under the 1954 deed and further stated,

> **Ambre, as a surface owner, has the right at the appropriate time to review our plans and consent, or not consent. If Ambre refuses to offer its consent to a compliant mine and reclamation plan, Ramaco can, and will, petition the Wyoming Environmental Quality Council (EQC) for an order in lieu of consent.**

Despite acknowledging BHC's statutory rights, following BHC's refusal to consent to the mine plan and reclamation plan Brook Mining provided BHC to review (which as noted below was different from the mine plan and reclamation plan Brook Mining submitted to DEQ/LQD with its mine permit application), Brook Mining apparently provided the 1954 deed to DEQ/LQD in lieu of BHC's statutory right of consent. See Adjudication, Appendix A Index, Brook Mining Application. BHC admits that it does not possess the right of consent to entry by definition under W.S. 35-11-406(b)(xi), and by virtue of the surface use reservation in 1954 deed, Nevertheless, ***nothing*** in the Wyoming surface coal mining statutes permits a mine permit applicant to utilize a deed, with a general reservation of surface rights, to strip a surface owner under W.S. 35-11-406(b)(xii) of its rights to *review* a compliant mine and reclamation plan and to *refuse to consent* to such plan, or to *exempt* a mine permit applicant from its obligation to petition the EQC and provide sufficient evidence upon which the EQC can make the findings necessary under W.S. 35-11-406(b)(xii)(A)-(E) to support an order in lieu of consent.

According to W.S. 35-11-406(b)(xii), the EQC shall issue an order in lieu of consent if it finds that (A) the mining plan and the reclamation plan have been submitted to the surface owner for approval; (B) the mining plan and reclamation plan are detailed so as to illustrate the full proposed surface use, including proposed routes of egress and ingress; (C) the use does not substantially prohibit the operations of the surface owner; (D) the proposed plan reclaims the surface to its approved future use, in segments if circumstances permit, as soon as feasibly possible; and (E) for surface coal mining operations, that the applicant has the legal authority to extract coal by surface mining methods. Absent a specific exception in the statute, it is not reasonable to infer that the Wyoming Legislature intended that a deed executed and recorded long before enactment of Wyoming's surface coal mining statutes, by parties who no longer own the minerals or the surface, should negate the EQC's statutory obligation to consider, among other things, whether a mine plan proposed in 2014 would substantially prohibit the present surface owner's operations.

Federal surface coal mining statutes allow a mine permit applicant to submit a conveyance that *expressly grants or reserves the right to extract the coal by surface mining methods* in lieu of written consent from the surface owner. *See* 30 U.S.C.A. § 1260 (b)(6) ("SMCRA"). Wyoming's surface coal mining statutes, which preceded SMCRA, contain no such provision, and despite adopting other post-SMCRA amendments, the Wyoming legislature has never seen fit to adopt a similar conveyance in lieu of a consent provision. In *Belle Fourche Pipeline Co. v. Wyoming*, 766 P.2d 537, 548 (Wyo. 1988), the Wyoming Supreme Court noted that "[e]ven though this provision is included in the SMCRA, surface owner consent was not one of the provisions specifically required to be included in a state program." *Id.* According to the court, "Wyoming went even further than the SMCRA in its effort to provide more specific protection of the surface owner" by imposing a qualified requirement that a non-resident, non-agricultural surface owner be "granted the right to a hearing if they object to the proposed mining activities, after which the EQC still could issue an order in lieu of consent." *Id.* at 547-48. The requirement set forth in W.S. 35-11-406(b)(xii) is clear and unambiguous. Brook Mining cannot avoid this requirement by providing DEQ/LQD reservation language in a 1954 deed.

Overlapping Permits

As expressly stated in LQD's Coal Standard Operating Procedure No. 2.1 – Coal Permit Content and Review Procedures Relating to Abutting and Overlapping Coal Permit Area Boundaries, "overlapping permit boundaries create unusual permitting, field inspection, annual reporting, and reclamation performance bonding challenges." According to SOP No. 2.1 both permittees have joint responsibility and control over shared lands and ***"there must be cooperation and agreement between the two permittees. Both permits must have mutually compatible Mine and Reclamation Plans that outline the respective operations within the overlapping permit area."*** SOP 2.1, Section II.D. Brook Mining has been uncooperative. There is no agreement between Brook Mining and BHC; and the mine and reclamation plans provided by Brook Mining to BHC failed entirely to outline the respective operations of Brook Mining and BHC within the overlapping permit area. Indeed, the mine plan Brook Mining provided to BHC for review differs from that presented in the Brook Mine Permit Application.[4] These varied representations of Brook Mining's plans stand in direct contrast to the cooperation and agreement contemplated by SOP 2.1.

[4] Similarly, the map Brook Mining attached to its written offer to purchase 452 acres of BHC's land is not the same as a supplemental map Brook mining filed in the lawsuit – the map Brook Mining filed with the court shows an area of high wall mining in the north half of Section 22, while the map enclosed with the offer letter does not show any mining in Section 22, but shows the Phase I rail spur being built over the high wall mining area. The map submitted to the DEQ with the Brook Mining permit application shows high wall mining in the north half of Section 22 as well.

SOP 2.1, Section III.B.1.b., Permit Adjudication Section, further provides that a new permit application "must contain a written statement from Permittee 2 that all application elements addressing shared land are acceptable to Permittee 2." It appears that the Brook Mine Permit Application Adjudication Section contains no such written statement from BHC.

SOP 2.1, Section III.B.1.c., Mine Plan, further provides that the Mine Plan for each permit containing an overlapping permit area must include a separate section for each permit area boundary configuration that includes a brief discussion of how the mining operations coincide for the joint use areas. The Brook Mine Permit Application Mine Plan provided to BHC for review contained no such discussion.[5]

SOP 2.1, Section III.B.1.d., Reclamation Plan, further provides that the Reclamation Plan for each permit containing an overlapping permit area must include a separate section for each permit area boundary configuration that includes a map specifying the reclamation responsibility of each permittee. The Brook Mine Permit Application Reclamation Plan provided to BHC for review contained no such map. Nor did the Brook Mine Permit Application provided to BHC for review address the respective performance bond obligations of BHC and Brook Mining within the overlapping permit boundaries as required by SOP 2.1, Section III.B.1.e.

SOP 2.1, Section II.B., Definitions, states that where overlapping permit areas occur, the LQD's position is that both permittees have joint responsibility and control over shared lands. BHC's Mine Permit No. 213-T8 expressly provides that BHC shall conduct their operation in a manner which prevents violation of any applicable State or Federal law. If a violation is found to exist in the overlapping permit area, it is uncertain what effect this will have on BHC, BHC's mining permit, and BHC's insurance coverage, especially if the violation cannot be

[5] The proposed "joint use" of greatest concern to BHC is that area south of the Tongue River and adjacent to BHC's existing shop facilities. The area was mined in the early to late 1970's and has since been backfilled with unconsolidated, saturated spoil materials with a direct connection to the Alluvial Valley Floor (AVF) of the Tongue River. Mining the Carney and Masters coal seams in this area would require a significant amount of de-watering and discharges into the Tongue River, causing catastrophic damage to the hydrologic balance. Additional monitoring wells in the immediate vicinity of the proposed coffin pit trench cut would be necessary to quantify the amount of water that would be intercepted.

In addition, Brook Mining has proposed stockpiling material on BHC lands in the immediate vicinity of wetlands and an AVF, without consulting with BHC regarding alternate locations that would be more environmentally friendly and would also accommodate BHC business development strategies.

Finally, Brook Mining's proposed mine plan would render reclamation of the historic Placheck Pit (AML Project No. 171 – Northeast Wyoming Coal) on BHC surface lands impossible.

directly associated with one permittee's actions. BHC has many concerns surrounding its potential liability for Brook Mining's activities performed in the overlapping permit area. Additionally, although SOP 2.1 does not specifically address LQD-authorized activities conducted pursuant to a Coal Notification within an existing mine permit boundary, BHC asserts that cooperation between the parties is equally important under those circumstances as the same concerns regarding liability arise for activities performed by Brook Mining pursuant to their Coal Notification in BHC's mine permit area.

Requested Action

BHC sincerely appreciates LQD's responsiveness to BHC's inquiries to date. For the reasons stated above, BHC respectfully requests that DEQ/LQD (1) expressly acknowledge BHC's right, pursuant to W.S. 35-11-406(b)(xii), to review and consent to the mine plan and reclamation plan Brook Mining submitted to DEQ/LQD; (2) absent BHC's consent to a compliant mining plan and reclamation plan, require Brook Mining to petition to the EQC for an order in lieu of consent; and, (3) require that Brook Mining provide BHC (i) a list of wells and plan of operations, and (ii) prior notice of entry, under any existing or future Coal Notification that permits activities within the boundaries of BHC Mine Permit No. 213-T8.

Sincerely,

Lynnette J. Boomgaarden

Lynne Boomgaarden
Crowley Fleck, PLLP

cc: Andrew Kuhlmann
Mark Rogaczewski

MEMORANDUM

TO: File, Brook Mine Coal Mine Permit Application, TFN 6 2/025

FROM: Bj Kristiansen, PG, Natural Resources Program Principal

DATE: March 6, 2015

RE: Brook Mine application review of Adjudication, Land Use, History, Climatology, Topography, Geology, Overburden Assessment, Hydrology, Alluvial Valley Floors, Mine Plan, and Reclamation Plan

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My review of the Brook Mine Coal Mine Permit Application is complete. My comments, critique, and perceived deficiencies are as follows:

LOCATION IN DOCUMENT	COMMENTS
	Appendix D1, Land Use
Table D1. 3-1	1) It is unnecessary to list the Expired Permit category of gas well permits. Since these APDs have expired without completion there is no related activity to the site. Listing of a non-event is not required. This also applies to the NO category since this indicates that the APD was refused, thus never became permitted through WOGCC.
	Appendix D2, History
	2) There are no comments for this section of the application. The narrative is well written and comprehensive.
	Appendix D4, Climatology
	3) General comment – Is there no data for climatology that is more recent than 1990? It exists, therefore needs to be represented. Please locate and include the most recent climatological data. Twenty year-old data bears little resemblance to Sheridan County climate today so characterization of the present climate with a 20 year gap is problematic. Please reevaluate the data in light of locating and use more recent information.
Section D4.2.6	4) Why was 65°F used as the baseline temperature? Also, why were the high and low temperatures set to 86°F and 50°F respectively? Please clarify.

Figure 4.2-11

5) Are the degree days the total number of days that match the data points for the entire period from 1961 through 1990? This indicates that the data represented along the Y axis covers a period of 30 years on a daily basis. Please clarify.

Appendix D5, Topography, Geology, and Overburden Assessment

Section D5.4.1

6) Paragraph 2 refers to "marginally suitable Selenium levels" as defined in LQD Guideline No.1. Guideline 1 has two separate sets of chemical quality criteria tables. Appendix 1 occurs on pages 17-21 as well as on pages 38-43. The first set of tables have been superseded by the second set of tables. Please use the tables on pages 38-43 when determining material suitability. The first Appendix 1 is being removed from the guideline.

The newer tables define the Selenium target as follows:

Suitable < 0.3 ppm
Marginal 0.3 – 0.8 ppm
Unsuitable > 0.8 ppm (dependent on premining water quality and overburden quality)

These values are established for uplands and ephemeral drainages unless it can be shown that Selenium impregnated materials will be buried above the groundwater potentiometric surface and below the reclaimed surface root zone. Other quality criteria have not changed.

Figure D5.3-2

7) What units are expressed in the figure as the %g? Please include a footnote clarifying the measurement parameter.

Addendum D5-1

8) Are the Northings and Eastings in State Plane coordinates? It is assumed that they are but please verify this. The title at the top of the page could read **Drill Hole Tabulations (State Plane Coordinates)**

Addendum D5-2

9) Please rearrange the Lithologic and Electric logs in such a way that the Electric log immediately follows the Lithologic log. This allows for a more comprehensive examination of the data.

10) Holes R12-000 through R12-020 have the Northings and Eastings reversed. Please correct.

11) The Lithologic logs with the AMBRE designation 02, 03, and 04 do not have coordinates or elevations. Please provide coordinates and elevations for these three holes.

12) Hole R13-018 appears to have erroneous coordinates. The Northing is listed as 11,941,802. It should probably be 1,941,802. The elevation is shown as 43,887.9, where it should probably be closer to 3,887.9. Please verify and correct.

Hole R13-024 has a very high Northing at 61,941,541 and elevation at 73,885.4. These may be 1,941,541 and 3,885.4, respectively. Please verify and correct

13) A suggestion for future exploration: Ask the geophysical logger to reduce the gain on the gamma logs. The readjustment bounce on the logs makes them a bit difficult to read and interpret.

Addendum D5-5, Pg. D5-5-4

14) The splitting tensile strength tests were run on four (4) samples from two (2) holes representing roof, coal, and floor conditions.

a) Why were these locations used as representative of the lithologies encountered during mining?
b) Are these few samples representative of all conditions expected to be encountered by the continuous miner (CM)?

Please elaborate and clarify the narrative. A statement **must** be made that strength testing will be performed on at least one set of samples per mining panel prior to use of the CM to insure that conditions are favorable for roof retention without subsidence. Lithology in this area is inconsistent and rock strength can vary accordingly. Using the data provided on the four samples tested indicates that some of the overburden from hole R13-19 is unsuitable for highwall mining, based on the CAT® Site Evaluation Tool For Highwall Miners; (http://webtools.cat.com/globalmining/highwallminers/index.html).

Addendum D5-4, Exhibits 1 – 7

15) Please include the drill hole locations on these isopach maps.

Exhibit 8

16) The map labeled as the isopach map of the Lower Masters bed is a contour of a surface. Please replace the contour map with the appropriate isopach map

Appendix D6, Hydrology

Section D6.2.3, Pg. D6-20

17) Narrative in the last paragraph – why were no samples taken in Hidden Water Creek? Please explain.

Table D6.1-8

18) Regarding the HEC-RAS modeling results – The values for Hidden Water Creek and Slater Creek are identical. Is this accurate or is it a typographical error? Please clarify.

Addendum D6-7

19) The well construction summary sheets need to have the coal bed names listed on the well lithology sections to the right of the well diagrams. Please label accordingly.

Attachment D6-8-A, Pg. D6-8-20

20) A statement is made that water within both coal seams is expected to be "high quality" and "good" water. Please define the meaning of those characterizations. Are these judgments based on MCLs or some other value? Are they being classified

by some constituent values? Or is there another metric being used? Please clarify.

For example; referencing WQD R&R, Chapter 8, Table I, Class I,II, or III would better define the essential characteristics of the water quality. Numerical values of critical constituents, such as TDS, could also serve to define the quality as "good". More descriptive qualifiers are needed to judge the water quality.

Attachment D6-8-E, Hydrographs

21) The x parameter, time, is depicted in days. It appears that this scale should have been adjusted to show time in hours due to the rapid changes seen in the hydrographs. Please use a finer scale for the x axis.

Attachment D6-8-F

22) The above mentioned comment can also be applied to the Carney well hydrographs. Please adjust the x axis to hours.

Addendum D6-9, Pg. D6-9-2

23) Please include a column in Table D6-1 that indicates the elevation of the bottom of the well or TD. The total water column is important when assessing groundwater characteristics. Please correct.

Addendum D6-10, Pgs. D6-10-28 through D6-10-53

24) On the sample analysis reports, Please provide a brief narrative at the beginning of the lab results to give context to the data. Footnotes on the pages refer to MCLs or other parameters of water quality used for classification. However, the context that is used to define these parameters is missing. The assumption is made that these quality values are derived from the WQD R&R, Chapter 8, Table I definitions. But that is uncertain as no frame of reference is given. A brief sentence or two at the beginning of the section would clarify the numerical standards used in the report. Please adjust the narrative accordingly.

25) Please include the lithology of the sampled zone, either in the sampling information sheets, or on the sample analysis reports. Identification of the lithology sampled needs to be readily available with the analysis. This applies to all increments sampled. The sampled zones do have identification on the sample sheets with a shorthand nomenclature but persons unfamiliar with the lithology of the prospect area would be at a disadvantage when evaluating the sample results. A simple reference table at the beginning of the section would be sufficient. Foe example; MST=Masters, CRN=Carney, AL=Alluvium. Non-geologists need some frame of reference. Please create a clarifying narrative.

Appendix D11, Alluvial Valley Floor

Section D11.1

26) RAMACO has requested LQD to make a determination on the nature of the drainages as potential AVF within the permit boundary as well as within ½ mile of the permit boundary. This

would then entail analysis of the following drainages (distances are approximations):

- Hidden water Creek – all (4 mi.)
- East Fork Earley Creek – lower 1 mile
- Slater Creek – lower 3 miles
- Tongue River – ½ mi. east of Interstate 90 and 4 mi. west of Interstate 90 at the Acme exit.

Prior to such a declaration, LQD staff will have to perform a variety of assessments designed to assist us in making a declarative statement about AVF classification. An AVF declaration will be made after in-depth study of the drainages. Such investigation will consist of, but not be limited to:

1. Field evaluation of the geomorphic and lithologic character of the drainages in question;
2. Determination of the agricultural characteristics of the stream course;
3. Examination of available bore hole logs that can be used to characterize the subsurface materials beneath the valley floor;
4. Determination of groundwater and surface water characteristics, both quantitative and qualitative, within the drainages in question;
5. Other evaluation processes that may be deemed necessary should initial findings warrant further, in-depth analyses.

Addendum D11-3

27) Some of the borehole and well logs indicate a damp or wet interval encountered during drilling. Was an attempt made to allow wet materials to produce water prior to continuation of the hole or was water noted after adding another drill steel and lowering the kelly to begin the next 20 feet of hole? Typically, after the steel has been added and the compressor is engaged, a small amount of water can be air-lifted before the rotary table begins to turn. If so, are there field notes indicating water was observed during the connection?

Volume 11, Mine Plan

Section MP.1.2.1, pg. MP-4

28) Tunnel and pillar widths are discussed in general terms. Please approximate a range for the widths, in feet, in the narrative to give context to the discussion.

29) The fifth sentence, beginning with "To minimize the amount of exposure..." does not make sense. Please rewrite the sentence for clarity.

30) The narrative also references figure MP.1-3 as a general schematic of the highwall mining operation. The figure depicts significant vertical highwalls above the mining operation. The text mentions that the highwalls will be vertical where the

Masters and Carney converge but the illustration depicts conditions where the coal seams appear to be separated by a considerable thickness of parting. It is our experience that vertical highwalls in the Powder River Basin are unstable and should be discourage wherever possible. What would the maximum thickness of burden approximate where the vertical highwalls will exist? Please include an average on the schematic as has been done for pit width and bench width.

Pages MP-3 and MP-4

31) These pages describe the highwall mining operation in vague generalities. The narrative states that the continuous miner will advance into the working face to a depth of 2,000 feet. The manufacturer's specifications for the ADDCAR system state that the depth of a cut is 1,600 feet. Is this a discrepancy of 400 feet or is there a difference in mining tools and the ADDCAR system comes with multiple depth capacities. Please clarify.

32) A general word of guidance – Ramps are mentioned in the narrative as designed to an 8% grade. The Cat 777 can generally handle this grade fairly well under most conditions. The Mack Titan trucks, however, may be problematic under certain conditions. Entering the pit on the ramp could be difficult for the Mack trucks with pups if the ramp has been watered to control dust. The overburden materials used for ramp systems are generally silty with a clay matrix and overwatering can create slipping hazards for vehicles. A truck with multiple trailers will have difficulty navigating these conditions. A 6% ramp under these situations is strongly advised.

33) The narrative describes the tunnel width as variable, depending on the cutting head chosen. Please indicate approximate footages of the tunnel widths. For example, Bucyrus and Joy manufacture continuous miners that have heads ranging from 11 to 12 feet in width. A mention of those widths would clarify the narrative. Also the protective coal pillars are described but have no dimensions indicated. The pillar width to tunnel width is crucial so an approximation of the remnant pillars width in feet is required. Please include approximate widths for tunnel and pillar widths.

Section MP.1.2.2

34) The dozer push method of overburden removal is not adequately described. Though Figure MP.1-4 does depict the dozer push materials to some extent, the overlapping nature of the multiple lift system can be confusing to some. The narrative on page MP-4 is too brief. Please elaborate further on the dozer push staging and overburden removal. Perhaps an illustration that depicts the dozer removal in stages would be more appropriate. This can be accomplished by creating a series of

	illustrations rather than only one. Please clarify the methodology.
Section MP.1.4, Pg. MP-5	35) The last sentence does not make sense. Please rewrite the sentence.
Section MP.4.2.3, Pg. MP-15	36) The discussion of temporary topsoil stockpiles describes creating a ring ditch around the topsoil pile if there is a potential for water erosion during the 2 week to 6 month life of the pile. Since the climate is unpredictable and subject to rapid changes, temporary topsoil stockpiles (2 weeks to 6 months) will be required to have ring ditches in all cases with no qualifiers. LQD writes more violations concerning inadequate topsoil practices than any other issue. Rewrite the narrative to indicate that all temporary topsoil stockpiles will have a ring-ditch and berm created for piles having a life of 2 weeks or more. Keep in mind that even a short-lived topsoil stockpile could generate a violation if a sudden rainstorm were to erode the soil and waste it on the surrounding terrain. RAMACO may want to allow for this as well.
Section MP.4.3.4, Pg. Mp-17	37) A swell factor of 16% is being used to convert bank cubic yards to loose cubic yards. The number was generated from information attained from Big Horn Coal (PT213). Where was this information located? Many of the coal mines in the northwestern corner of the Powder River Basin use a swell factor of 13% - 14% since the overburden material is finer grained, with a higher clay content than mines on the eastern margin of the basin. Please cite the use of a 16% swell factor.
Section MP.6.1, Pg. MP-39	38) The second paragraph discusses surface runoff attenuation during mine years 4 and 5. The peak flow rates for precipitation events will be attenuated by the mining trenches that lie perpendicular to the flow in the local drainages. What flow events are expected to be attenuated by the trenches? Will the 2 year, 10 year, or 100 year events be considered as an average event? Please modify the narrative, in general terms, to define which precipitation event will be used when designing the pit drainage plans.
Section MP.8, Pg. MP-47	39) The narrative mentions that potable water will be hauled to the mine an placed in a cistern. Why is a cistern system being considered for potable water instead of a reverse osmosis unit? The local residents use such systems as do the mines. How large of a cistern will be used for water storage? Please modify the narrative to expand on the rational behind using a cistern.

Section MP.9.9, Pg. MP-52	40) When pre-dug mud pits are to be used for exploration drilling, the topsoil must be protected from contamination by removal and stockpiling. The pit location must be stripped to the base of the soil with an areal extent that allows the pit materials to be stacked as spoil without encroaching on native surface. Reclamation shall occur in a manner that will best restore the surface to its pre-disturbance condition. These contingencies need to be better described in the narrative. Please modify the text to reflect the aforementioned conditions.
Section MP.18, Pg. MP-68	41) The second paragraph discusses the speed limits that will be set on haulroads to protect wildlife. Approximately what speed limits will be used?
Section MP.20, Pg. MP-69	42) The brief description of underground mining should state that no "conventional" underground mining will occur. Highwall coal recovery is an underground mining technique, but no personnel work underground. Thus the mining is modified underground mining.
Section MP.24, Pg. MP-70	43) The word "Operation" is misspelled in the title (OPERTATION).
Section MP.25, Pg. MP-71	44) The second paragraph, third sentence, discusses requiring additional permitting. The word "additional" is misspelled (addidtional).
TABLE MP.1-1	45) The total disturbance should read 895 acres, not 775. Please correct the table.
FIGURE MP.1-3	46) The average width of the pit floor and safety bench have average widths indicated on the drawing. Please insert the average heights of the vertical highwalls in these situations.
FIGURE MP.1-4	47) The cross section, as drawn, is confusing. It would appear that dozer pushed, loose material significantly exceeds the bank material available in the highwall. The figure is not drawn to scale but a more accurate attempt to represent dirt volumes would be appreciated. Also, the cross section itself does not make sense in the way that operational steps are illustrated. A series of cross sections over time would be much more beneficial to define the appearance of the dozer push. Please modify the figure accordingly. A sample of an idealized schematic is attached. It is volumetrically accurate.
FIGURE MP.4-3, Pg. MP-F7	48) What is the narrow, vertical rectangle located in the center of the coal stockpile coming from the stacker?
Addendum MP-3, Pg. MP-3-2	49) The introductory paragraph states that the Brook Mine is approximately 6 miles northwest of Sheridan, Wyoming. However, in earlier narrative, the mine is said to be 6 miles south

of the Montana border and 8 miles northwest of Sheridan. This passage is found in the Land Use Appendix D1-1. The distances should be uniform in all instances throughout the narrative.

(Cross Section insert follows)

Section 2.3, 50) Figures 2.3-1 and 2.3-2 show the potentiometric surfaces for the Carney and Masters coal beds. The contours daylight and appear to be in mid-air over the Slater Creek drainage. Please adjust the contours so they terminate at the outcrop.

Addendum MP-6

Section MP-6.1, Pg. MP-6-3 51) The second to last paragraph indicates that the depth of the penetration by the continuous miner will be 2,000 feet. Is this an approximation since the listed depth for the ADDCAR device is 1,600 feet. Please clarify the discrepancy.

Section MP-6.1, Pg. MP-6-4 52) The discussion in this sections centers around the necessity of maintaining a straight, even cutting depth to prevent pillars from being cut too narrow to hold up the roof material and allow subsidence. The 1:1 ratio suggested by NIOSH is acceptable as long as roof strength tests bear up (no pun intended) the use of the general guidelines. A small sample of tests have been run on roof and coal rock intervals and those tests have been reported. LQD requests a narrative placed either in this location of the text or other location of RAMACO's choosing that discusses the strength tests results as it pertains to roof stability. Also, a commitment must be made in the document to sample roof material for strength testing for at least one location in every panel that will mined by the continuous miner prior to mining. Our concern rests with the competence of the overlying lithologies and their possibility for subsidence. This has been a problem in this area for decades and care must applied to characterize roof materials accurately.
A sampling plan to test compressive strength above each coal panel must be submitted prior to permit approval.

53) Please provide the data used as input for the ARMPS-HWM program.

FIGURE MP-6.2-2 54) The scale of the photograph is too large to adequately depict the zones of surface subsidence from the old underground mines. Please blowup the scale to allow for clear visibility of the subsidence.

FIGURE MP-6.2-3 55) This figure is very effective. It clearly shows the subsidence evident on the air photo as it correlates to the old underground map superimposed on it. One problem, though, is that the air photo base needs to be darker, with greater contrast. The photo is a bit washed out and manipulation of the brightness/contrast aspects of the photo would help its visibility greatly. Please recalibrate the photo tonality.

Addendum MP-8
Section MP-8.5.4

56) The last sentence in this section indicates that there is no suitable habitat available for the Northern Long-Eared Bat. Does this include the climax Cottonwood Forest along Tongue River? The well developed understory along the river is suitable for Long-eared bat habitation though none have been located in this area. Or does the negation of the existence of the bat only apply to the area in the hills above the river where the mining will occur. Please clarify the area that was considered for potential Long-Eared Bat occurrence.

Volume 12, Reclamation Plan

Section RP.8.3, Pg. RP-37

57) The narrative describes the sources of recharge to the coal seams. One lithology mentioned as a positive recharge contributor is the overlying burn, scoria, or clinker material, generated by coal fires. It is a common misunderstanding that the scoriaceous material recharges coal or overburden. It would appear, at first glance, that the broken, vuggy material would be capable of conveying large amounts of water from the surface to materials beneath. That is not the case, however, as the coal/scoria interface has a zone of partially metamorphosed coal ash that lies between the burned material and the remnant coal. I have seen this zone many times during my 25 year career in the coal mines when supervising coal and overburden removal. This zone is characterized by a white to light gray, clay band that ranges in thickness from 6 inches to a foot or more. It is the same high silica ash found in the bottom ash of the local power plants that burn PRB coal. This ash band acts as an aquaclude, preventing water from entering or escaping the coal. Because of this, any recharge models that were run using the scoria as a recharge source must be reevaluated using new layers that do not include the scoria. Rerun recharge models if needed.

Section RP.8.3, Pg. RP-39

58) The second sentence in the first paragraph has an odd, difficult to understand syntax. Please rewrite the sentence for clarity.

EXHIBITS

Addendum D5-4, Exhibit 1

59) The title on the map declares that this is an overburden isopach, but the bed name is missing. Please indicate which bed this map pertains to.

Exhibit 8

60) The name of the PDF file for this exhibit indicates that this is an isopach map of the Masters Lower coal bed. The title in the map indicates that this is the contour of the base of the Masters coal seam. Please correct the title of the PDF file.

Addendum D5-6
Exhibit 1

61) We commend RAMACO for sampling overburden locations on 80 acre spacing. There are some gaps in the sampling plan, however, that need to have core holes drilled to fill them. The

	underground Coal Rules and Regulations in Chapter 7, Section 1(a)(i) are specific on ensuring that overburden geology is characterized in all locations where overburden will be removed or subsidence may occur. This essentially means that all areas above the planned coal panels need representative cores drilled to a sufficient density, approximately one hole for every quarter section of affected area. Based on that, The following locations still need to be characterized by overburden sampling: NE1/4, sec.22, T.57N., R.84W. NW1/4, sec.15, T.57N., R.84W. NW1/4, sec.14, T.57N., R.85W. SE1/4, sec.10, T.57N., R.85W.
Exhibit D5.1-1	62) Kudos to the staff member that created this slope analysis map. It is clear and concise and the histogram is very informative. Good job.
Addendum D10 Exhibits	63) The permit boundary layer on all of the exhibits covering the aquatic resource boundaries is incorrect. Please correct the permit boundary layers.
Mine Plan Exhibit MP.1-1	64) The patterns used to depict surface disturbance from year to year are too similar. It is difficult to differentiate between year 0 and year 2, for example. Please recreate the surface disturbance layers to be more unique. The overburden removal sequence map (Exhibit MP.4-4) is a good example.
Reclamation Plan Exhibit RP.6-1	65) The permit boundary on this map is inaccurate. Please recreate the permit boundary layer.
Exhibit RP.8-3 and Exhibit RP.8-4	66) The post mining potentiometric surfaces for the Carney and Masters beds are suspended in mid-air over Slater Creek. Please terminate the contour lines at the outcrop or use a dotted line to indicate the calculated potentiometric surface.

End of comments from Bj Kristiansen.

MEMORANDUM

TO: Bj Kristiansen, LQD-DIII Assistant Supervisor

FROM: Doug Emme, Blasting Program Principal

DATE: April 2, 2015

SUBJECT: RAMACO Brook Mining Co., LLC; Brook Mine Coal Permit Application; TFN 6 2/025

I have completed my review of Mine and Reclamation Plans for this permit application and there are several comments that need to be addressed. There has been no Reclamation Bond Estimate submitted at this time so there is nothing to review. The following items need to be adequately addressed before this permit can be approved:

Mine Plan

1. **Figure MP.1.2 and page MP-3** – MSHA and best practices may require a safety berm on this safety bench which could require a wider bench. Figure MP.1.2 notes a minimum of 35' but the text on page MP-3 just states the bench will be 35' wide. There is a real possibility this safety bench might be used for light plants so it may need to be wider for access and small vehicle use as well as providing a safety bench.

2. **Table MP.1-1** – The total disturbance doesn't seem to match the overall disturbance listed for the trench mining and facilities. Please explain or correct.

3. **Section MP.2.3, page MP-9** – The 1st sentence would be better if it started, "The explosive materials…". The 2nd sentence should replace the word "detonating" with "explosive". The 5th sentence in the 2nd paragraph should include cast boosters. The 6th sentence in the 2nd paragraph should discuss storage of emulsions, water gels, and slurries also. This section should also commit to proper signage of the explosive storage area. Please correct.

4. **Section MP.5.7.5, page MP-34** – The word "of" in the 2nd line of the last paragraph should be "or". Please correct.

5. **Section MP.6.1, page MP-39** – The 1st sentence of the 1st full paragraph needs some improvement so it reads properly and makes sense. Please correct.

6. **Section MP.14.2, page MP-55** – The 2nd paragraph discusses the use of "cast primers". The term should be "cast boosters" as it doesn't become a primer until the detonator is added or detonating cord is attached to it. The discussion of

priming holes should describe the use of a cast booster and how it is made-up to become a primer, i.e. with detonating cord or a detonator (blasting cap). Please correct.

7. **Section MP.14.3.2, page MP-56** – In the 2nd line the item "(primer with detonator)" should be changed to "(cast booster with detonator)". Please correct.

8. **Section MP.14.3.2, page MP-56** – The 2nd paragraph discusses powder factors in coal and overburden and the high end of the ranges is extremely high for the type of rock and coal in this area. RAMACO should eliminate the range and simply state powder factors will be adequate to effectively fragment the overburden and coal.

9. **Section MP.3.3, page MP-56** – RAMACO should reword this to say that initiation will be done using non-electric or electric systems, which may include electronic detonators, shock tube detonators, detonating cord, electric detonators or a combination of these. Igniter cord is used to initiate safety fuse and it's highly unlikely that any safety fuse will be used at this mine. Please correct.

10. **Section MP.14.4, pages MP-56 & 57** – It is probable that emulsions will also be stored on site so it should be mentioned since emulsion/ANFO blends are the most widely used product in wet holes. Please correct.

11. **Section MP.14.6, pages MP-57 & 58** – Residents who request a pre-blast survey must make the request to the permittee and the Administrator of Wyoming Land Quality Division (LQD). The permittee is responsible for getting the pre-blast survey done and distributed to the person that requested it and the LQD Administrator. Please correct.

12. **Section MP.14.7, pages MP-58 & 59** – LQD will not approve protecting uninhabited structures (what LQD refers to as engineered structures) at 8.0 inches per second (ips) of peak particle velocity. LQD would allow a maximum limit of 5.0 ips. RAMACO would have to assure that this limit was not exceeded by the use of a seismograph at these structures on all blasts. RAMACO could apply for a modified scale distance factor to show compliance with this limit of 5.0 ips by submitting a vibration study and doing a regression analysis to show the allowable ppv is not exceeded at a 95% confidence level. However, this will require the vibration study be submitted with seismograph records from shots in

the mining area so it cannot be done until after some blasting has been done at the mine. Please correct this text.

13. **Section MP.14.8.1, page MP-60** – The discussion on typical pattern size should be changed to more general language. Using the parameters given the powder factor used would be approximately 0.16 lbs./CY using ANFO and in the 0.23-0.25 lbs./CY range when shooting an emulsion blend. These powder factors are not high enough to adequately fragment the overburden. Please correct.

14. **Section MP.14.8.1, page MP-60** – The 2nd paragraph says if water is in the holes a slurry or water gel explosive will be used. Most likely an emulsion/ANFO blend with good water resistance will be used in wet holes and not a slurry or water gel. Please correct.

15. **Section MP.14.8.1, page MP-60** – The 3rd paragraph discusses the explosive weight per hole and the powder factors. The explosive densities listed are correct but the pounds per hole and powder factors are incorrect. In a 7.875" hole and with a density of ANFO of 0.85 g/cc the pounds/foot of hole is 17.95 lbs. and with 24' of powder column the pounds/hole is 431 lbs., making the powder factor = 0.16 lbs./CY. Similarly using an emulsion blend of 1.32 g/cc the pounds/foot = 27.87 lbs. and the pounds per hole would be 669 lbs. so the powder factor =o.25 lbs./CY. In the 50' hole described with 26' of stemming and 24' of powder the powder distribution is poor so it would likely lead to blocky material near the top of the bench. Please correct.

16. **Section MP.14.8.2, page MP-61** – Drilling a 35' x 35' pattern in a 15' thick coal seam with a 7.875" hole and 4.5' of stemming will probably result in excessive flyrock, stemming ejection, high airblast and hard zones between the holes. Expecting to stem 4.5' is not realistic – in the field the blaster is going to try to hold for 4' or 5' of stemming. Again RAMACO discusses using slurry or water gel in wet hole when an emulsion/ANFO blend with high water resistance would probably be used. Please correct. Also the powder factor listed for coal is probably a little high so it would be better to just say that the powder factor will sufficient to fragment the coal for the prime movers. Please correct.

17. **Section MP.14.10, page MP-63** – The last bullet item says that detonation during electric storms might be a reason for unscheduled blasting. This is confusing because it makes it sound like the operator would shoot during electric

storms and the only safe thing to do when an electric storm approaches is clear the pattern and keep everyone a safe distance away until the storm passes. Please correct.

18. **Addendum MP-7, Blaster's Log** – Under the "Holes" heading RAMACO should use "burden" not the term "burden spacing". On the 2nd page the word "signiture" should be changed to "signature". Please correct.

Reclamation Plan

19. **Section RP.5.1, page RP-6** – RAMACO states that the contoured surface will be scarified or ripped, if necessary. The mine should commit to scarifying or ripping all surfaces prior to topsoil replacement.

20. **Section RP.5.6, page RP-8** - The 1st sentence of the 2nd paragraph doesn't make sense. Please correct.

I would not recommend approving this permit application until these comments have been adequately addressed and a bond has been submitted and approved. If you have any questions please let me know.

MEMORANDUM

To: File, RAMACO Brook Mine Permit Application, TFN 6 2/025

Thru: BJ Kristiansen

From: Dave Schellinger, Soils Specialist, LQD District 3

Date: January 27, 2015

Subject: Round 1 review

As per your request for review dated November 13, 2014, I have completed a review of Appendix D1-Land Use, Appendix D5-Overburden Assessment, Appendix D7-Soil Resource Assessment, Appendix D11-Mine Plan and Appendix D12-Reclamation Plan and offer the following comments.

Appendix D5

1) The Coal Rules and Regulations, Chapter 7, Section 1(a)(i)(A) states that information required for the geological description pursuant to Chapter 2, shall be as follows: for areas where surface operations and facilities will cause removal of overburden down to a level of the coal seam, all information outlined in Chapter 2. Overburden sampling has not been performed in many of the locations where overburden will be removed during the mining operations. Additional sampling will be required to assess overburden chemistry in all areas where overburden removal will occur. The intensity of sampling should be 1 core per 160 acres (per quarter section). The LQD requests sampling every 1,900 linear feet on longer proposed disturbance areas or, at minimum, two cores within shorter disturbances separated sufficiently to provide a representative characterization of the proposed disturbance.

    a. Not all overburden has been characterized during analysis. Several lenses of shallow coal mixed with partings or narrow coal seams that will not be mined were not characterized. Because all overburden must be handled so as not to negatively affect surface water, groundwater or vegetation, all overburden must be adequately characterized. Therefore, the LQD requests additional characterization of all overburden that will be backfilled into disturbed areas. It must also be stated that special handling and/or identification and use of

topsoil/subsoil replacement may be required if unsuitable backfill or soil is placed within 4 feet of the surface on upland areas or within 10 feet of the surface in stream channels.

2) Section D5.4. – documentation of protocols that differ from those approved by the Administrator in Guideline 1 typically require a signed document by LQD staff, not a request for different procedure signed by the company. This issue has been discussed with other mining companies and it has been determined that documentation of approval by LQD staff will be required if sampling/analytical protocols differ from those required by standing LQD policy. Please provide documentation of LQD staff approval for the 10-ft. overburden sampling interval.

3) Table D5.4-1 and Table D5.4-2 do not provide the current approved selenium concentration limits of 0-3 ppm (suitable), 3-8 ppm (marginal) and > 8 ppm (unsuitable). Please be sure to include the current approved suitability criteria as shown in Guideline 1, page 42. This will change the conclusions of the discussion provided in the Appendix D5 text. Also, in Table D5.4-2, please provide the correct units for analytical results in mg/Kg, not mg/L.

4) The permit application provided to LQD staff for review has duplicated data provided after the map identified as Exhibit 1 which should be deleted. The exhibit should also be better identified as Exhibit D5-1 or something similar to clarify placement in the permit application should it become separated from the document in the future.

5) Comparisons were made between Exhibit 1, the soils map and the Mine Plan map. Distinct differences in the affected area and permit boundaries were observed. Please be sure that correct boundaries for the proposed affected area and permit area are provided on all maps. Please also provide the contour interval on this exhibit.

Appendix D7

6) Exhibit D7.3.-1 was compared with Exhibit MP.1-1. As required, it appears that the soil sampling was concentrated in areas where surface disturbance is to be expected. Please provide the contour interval on the soils map. For ease of review and to prevent misinterpretation, however, the map showing sampling locations should also clearly show the locations of proposed surface

disturbances instead of providing these details on separate maps which may or may not present differing scale distances.

7) Page D7-4. The second paragraph of this page contains text that should be deleted. It states "If for whatever reason overall sampling intensity.....was determined to not be enough, it is proposed that any additional sampling be deferred and included a stipulation of a future pre-stripping soil assessment program." The Mine Plan and Reclamation Plan soils handling and replacement is contingent on adequate baseline sampling of the proposed area that will be affected by mining operations (topsoil balance and stockpile location planning and bond calculation). Therefore, baseline sampling for soils must be adequate prior to approval of any permit application. Please remove the inappropriate language from the Appendix D7 text. If future changes to the Mine Plan require additional soil sampling the issue will be addressed at that time.

8) Page D7-9. Text appears in this section that upon NRCS declaration of prime farmlands occurring in the permit area, a letter will be provided to the DEQ. A letter from the NRCS has been received and inserted in the permit declaring no prime farmlands to exist. The text, therefore, is not appropriate and should be removed.

9) WS § 35-11-415(b)(iii) and the Coal Rules, Chapter 4, Section (c)(ix) state that if topsoil is virtually nonexistent or is not capable of sustaining vegetation then subsoil or a selected spoil material may be used as a topsoil or subsoil supplement. Additionally, due to the proximity of this mine to the Tongue River, a Class 2AB stream, limits for chemical contaminants will be imposed on discharges from the permit. Therefore, for areas where unsuitable or marginal topsoil chemistry is located (e.g. Wibaux channery loam, sample R13), an alternative soil replacement material should be identified and used in reclamation. Such a commitment must also be provided in the Mine Plan and Reclamation Plan to provide evidence that such issues that could affect the condition of reclamation and/or lead to off-site impacts will be addressed.

10) The description of Map Unit G (Bauxson Loam, sample R-19) does not show marginal selenium that occurs between 22 – 48 inch depth range which could affect the salvage depth and may require special handling of the marginally suitable subsoil.

Mine Plan

11) Depending upon the outcome of required overburden sampling, commitment for special handling of unsuitable overburden will be required to assure that placement of unsuitable materials so as not to hinder plant growth or to adversely affect surface or groundwater quality will be required in the Mine Plan.

12) Does RAMACO provide a better detailed description of the topsoil salvage and handling process than that discussed in section MP.4.2.1? The description provided is not detailed so as to provide a description of the equipment used, the methods for assuring adequate soil salvage, or whether topsoil and subsoil salvage will follow the recommendations in Appendix D7 for stockpiling topsoil separate from subsoil. Please understand that topsoil and subsoil may only be mixed if both meet Guideline 1 suitability criteria. Please include more detail for topsoil salvage and handling or let the LQD know where the information may be accessed.

13) Section MP.4.2.3 all topsoil stockpiles, even those stockpiled temporarily or windrowed at the edge of a disturbance, must be identified by a topsoil sign from initiation of the salvage operation as required under Chapter 4, Section (c)(D) that states that signs must be in place at the time stockpiling is begun. Therefore, the text in the first paragraph of this section stating that signs will not be required must be corrected. Signs will always be required to identify all salvaged topsoil and must be placed on all approaches to the topsoil and no more than 150 feet from the stockpile location.

    a. Additionally, all stockpiled topsoil, even windrowed along the edge of a disturbance, must be protected against wind and runoff erosion, compaction or potentially toxic materials no matter what the longevity designation of the stockpiled material. The Mine Plan must provide a commitment to these requirements.

14) Section MP.4.2.4 does not discuss topsoil salvage during winter months. Salvage during the winter months, especially of shallow soil profiles, is discouraged by the LQD due to a lack of depth control caused by varying depths of permafrost. Please provide discussion concerning this subject.

a. Even short term and temporary topsoil stockpiles must be identified on maps and the volumes accounted for in annual reports. Several criteria that must be considered are well established for placement of topsoil stockpiles and include:
    i. Construction of stable areas to minimize wind and water erosion
    ii. Stockpiles will not be placed in areas where runoff water can contribute to the loss of topsoil (side hills or drainages)
    iii. Stockpiles will not be constructed on unsuitable backfill locations
    iv. Stockpiles will have associated sediment control established in advance of construction
    v. Stockpiles will not be constructed at locations of known cultural or wildlife resources for which protection or mitigation is required.

b. Other topsoil stockpile construction and maintenance considerations include:
    i. Stockpiles will be constructed with slopes of 3h:1v or less
    ii. Bypass ditches, berms or equivalent may be used to divert runoff around stockpiles
    iii. Stockpiles that will remain for less than 1 year may be revegetated or treated with surface roughing methods such as ripping or discing to reduce runoff and wind erosion potential.

15) Section MP.4.2.7, page MP 4-5. Aside from operation of soil salvage equipment with the potential for soil contamination due to blown hydraulic hoses or small fuel leaks, the LQD expects not contamination of soil during the mining operation. Contamination of subsoil and overburden is more likely. The LQD recommends that RAMACO re-phrase the section header and text to show petroleum contaminated materials being and not soils.

a. What criteria will RAMACO use to determine if spills require reporting to the DEQ, and what process will be used in spill reporting?
b. What will the operational procedure be for management of the proposed on-site landfarm for contaminated materials, and where will it be located? Will it be identified on the ground by a sign?

16) Section MP.4.2.8. Please provide a detailed description for the disposal of empty drums, not just a citation of the EPA Rule which is probably not know by most readers of this public document.

17) MP.4.3.1 discusses overburden removal processes. However, little detail is given to explain the actual process for overburden handling. Will the first cut be stockpiled and used to fill the last cut? When special handling is required, which is almost certain given the nature of some overburden and the need for some soil replacement materials, what assurance will be made that poor quality materials will be safely located in the backfill or in separate stockpiles, or that topsoil substitutes will be handled and stored as topsoil in a useful manner as required under Chapter 4, Section 2(b)(x)(A)? Please provide a more detailed overburden handling plan. Perhaps some of these details are observed in later sections. Please provide additional details not provided elsewhere.

18) Section MP.4.3.4. The volumetric analysis shown in Table MP.4-4 and MP.4-5 may change depending on results of required additional overburden sampling and volumetric analysis. If the overburden depth overlying coal changes as a result of additional sampling, the volumetric analysis will also change. If post mining contour changes are necessary due to adjusted swell factors permit revision will probably not be required until the changed PMT exceeds plus or minus 20 feet of the approved at which time a Reclamation Plan revision will be required. This kind of detail should be included in the permit commitments.

19) Section MP.4.6.1. The typical overburden sampling protocol as stated in Guideline 1 calls for one sample taken every 40 square acres of the permit area. Overburden sampling for underground mining operations differs from typical coal mine sampling protocols and is stated in the Coal Rules, Chapter 7, Section 1(a)(i)(A) which calls for overburden sampling and characterization on areas where surface operations will cause removal of overburden down to the level of the coal seam. Please make changes to the text accordingly and perform additional overburden sampling where required.

20) Section MP.4.3.5. A statement was made in this section that "Overburden stockpiles will only block ephemeral drainages if runoff control and sediment control measures are made and approved by WDEQ/LQD." Placement of overburden in ephemeral drainages will require a discussion of how water will be diverted around the overburden stockpile to prevent impoundment of water in addition of a discussion of sediment control measures for the stockpile to prevent of-site impacts of erosion down-slope from the stockpile. The LQD recommends that no overburden stockpiles be placed in ephemeral drainages.

21) Tables MP.1-1, MP.1-2 and MP.4-1 must show the actual years for proposed progressions, or the year 1 progression must be tied to a specific year in the Mine Plan text.

22) Tables MP.4-3 and MP.4-5. Topsoil volumes appear to be underestimated in TS- 2, TS-6, TS-10 and TS-11 while underestimating the proposed volume in TS-1. Also overburden volumes appear to be underestimated in OB-4, OB-7, OB-11, OB-14 and OB-15, and overestimated in OB-16, which may affect estimates presented in TableMP.4-4 as well.

23) Exhibit MP.4-2 and MP.4-3 must show the dates (actual years) for the salvage of topsoil and removal of overburden, or year 1 must be tied to an actual year when operations will begin (2016, 2017, etc.). The map or tables in the Mine Plan must provide proposed years and volumes for stockpile construction as well.

Reclamation Plan

24) Section RP.4. This brief section discusses what is considered spoil material to be removed during mining. The section states that spoil does not include coal, but there are some very narrow coal seams with numerous stringers of clay or of such low quality that will probably not be mined and will be placed in backfill. Also, the top layers of most coal seams are quite "dirty" and would also be removed and backfilled. In order to provide the readers with a more accurate description of the mining and reclamation processes, please revise the text to show that some coal-laden materials will also be considered spoils and will be backfilled during reclamation.

25) Section RP.5.2. Please provide a description of the methods used to control topsoil depth during replacement. Most mining operations use stakes with surveyed marks as guides for controlling soil application depths.

26) Section RP.5.4. Variability in topsoil depth cannot be avoided due to limitations imposed by the equipment used and the pre-application preparations which may include ripping of the compacted overburden surface. Typically, the depth of topsoil application may vary 25%, but the average depth should be closely monitored and should not exceed the average availability. Also, because some soils exhibit unsuitable characteristics and will not be used for reclamation, discussion of the use of substitute topsoil materials is warranted in this section.

27) Section RP.5.6. Sediment control measures will be required to prevent untreated runoff from exiting reclaimed lands onto adjacent native lands. Please provide a discussion of the sediment control measures to be used.

28) Section RP.8.2. This section states only that impoundments will require Landowner, LQD and SEO approval. Prior to construction of post mining impoundments, SEO approved plans for the impoundments must be submitted for inclusion in the permit Reclamation Plan. Please include a statement that a Reclamation Plan revision will be approved by the LQD prior to construction of impoundments.

29) Section RP.11.1. The primary final land use for the permitted acreage will be grazing and wildlife. Only areas where the current use is industrial will remain industrial land uses after mining is completed. Therefore, in order for any constructed buildings or railroad access to remain following mining, and a permit revision to change the land use will be required. It is not just a matter of demonstrating usefulness to the LQD and receiving landowner consent. This will be a major revision to the permit that will require public notice. Clarification should be provided concerning the steps involved to allow building to remain.

30) All Mine Plan Maps with progressions must show the actual years of the initial disturbance or mining activity, or the progression must be linked to a specific year in Reclamation Plan text. The maps must also include the contour interval.

MEMO

To: File, Brook Mining Co., LLC, Brook Mine, TFN 6 2/025

From: Jaime J. Jakes

Date: February 5, 2015

Subject: Review of Permit Application for Brook Mine, TFN 6 2/025

Appendix D8

1. Please update the permit boundaries so that they are the same on Exhibit D8. 2-1 and Addendum D8 Map 1. I note specifically that lands should not be included within the permit boundary south of the interstate and that Section 10 TWN57N RNG85W displays different boundaries along the far west edge of the permit; it appears that the section lines are skewed between the two maps. The Addendum D8 Map 1 also is missing a sizeable amount of lands located in Section 21 TWN54N RNG84W which are included within the permit boundary of the Adjudication Exhibit 1 map. While comparing the maps I find that the maps display the same information in slightly different formats, please explain the necessity for two individual maps and at a minimum make them consistent against one another.

2. Why does the study area not include all lands within the proposed permit boundary?

3. The acreage displayed on Table D8.2-1 should equal that of the land permitted on the Form 11. The Form 11 displays 4,548.8 acres while the table shows 4,581.7 acres a difference of 32.9 acres. Please update either the Form 11 or Table D8.2-1 to show the true permit acreage as it relates to the vegetation communities. Upon further review I find that Table D8-2 located on page Addendum D8-1-41 exhibits the proper acreages in relation to the Form 11, thus the values represented there may be more accurately displayed in Table D8.2-1.

4. Table D8.2-1 states there are 56 acres of agricultural lands; however, I am unable to locate Agricultural lands north of the interstate. Please, discuss and edit the values to display true acreages in relation to the proposed permit

boundary. (See comment 3 for more clarification and another table for utilization to update values.)

Reclamation Plan

5. Exhibit RP 6-1 also displays permit boundary discrepancies in regards to the section lines on it and those located on the Adjudication Exhibit 1. Please update accordingly.

6. Table RP 6-1 states that there are 11.6 acres of wetlands and other aquatic resources. Please discuss where these acres are to be reclaimed and show them on the Exhibit RP. 6-1 which displays the reclaimed vegetation communities and their locations.

MEMORANDUM

TO: File, Brook Mining Co., LLC, Brook Mine, TFN 6 2/025

FROM: Stacy Page

DATE: January 28, 2014

SUBJECT: Review of Permit Application for Brook Mine, TFN 6 2/025

Appendix D-1.

1. Exhibit D1.1-1. The landuses defined in Chapter 1 should be used on this Exhibit. Not the entire Brook Mine Permit falls neatly into these definitions so the following comments provide guidance:

   a) The railroad, primary roads, oil and gas wells, and the facilities for Taylor Quarry would be considered Industrial commercial and may be shown with the vertical line stippling. The rest of the vertical stippling should be removed.
   b) The 4.5 acres of Agricultural lands would have the Land use of Cropland. This small acreage will not show up well on this map but is listed in Tables D.8-2 and RP.6-1 so no changes are needed to the map for this land use.
   c) The 12.8 acres of water might be listed under multiple landuses such as Grazingland, Fish and Wildlife habitat or Recreational. This small acreage will not show up well on this map but is listed in Tables D.8-2 and RP.6-1 so no change is needed to the map for this land use.
   d) The 4,421.8 acres remaining should be shown as Grazingland and Fish and Wildlife habitat. The legend on the map should have Fish and Wildlife Habitat added to Past and Present Grazingland landuse. The stippled area on the map will stay the same.
   e) No changes are needed to the areas identified as Recreational.

2. Text that refers to the areas mined as Industrial commercial should be revised to remove the mining. A reference to Section 1.6 on historic mining can be made in Section D1.3.1. Grazingland. The reclaimed mined lands are now being used as Grazingland. The difference between the mined and never been mined is defined as the vegetation community that is called Reclaimed. Section D1.6 discusses the historic mining of the area and the discussion on coal mining in Industrial commercial (D1.4.3) can be removed.

Appendix D-8 Vegetation Baseline

3. Page D8-3. Section D8.1.7. Guideline 2 is a non coal guideline. Please revise this sentence to reference the equation shown in Section D8-1.2.9 Sample Adequacy.

4. Page D8-4. Section D8.1.8. Please revise the second sentence to, "The EXREFA is all of the unaffected area for each native vegetation community."

5. Page D8-1-8. Section D8-1.2.4. The last sentence in this section states that no sample locations occurred within the Brook Mine Permit Area. AG-13, 14, 17 and 25 are shown on Addendum: D8, Map 1 inside the permit area. Please correct this statement or the permit boundary on the Map.

6. Page D8-1-11. Section D8-1.2.8. The last sentence of the first paragraph should be revised to, "Sample adequacy was not required for species diversity and composition."

Reclamation Plan

7. Page RP-13. Section RP.6.2.6. In the last sentence please add that substitutions to the seed mix will be made only with WDEQ approval.

8. Page RP-16. Section RP.6.4.1. To demonstrate that all of the unaffected acres of each vegetation community are sufficient for an extended reference area please create a table with total acres and affected acres and reference this table in this section.

9. Page RP-17. Section RP.6.4.1. Please add to the Ch. 4 reference in the first sentence on this page that the Handbook of Approved Sampling and Statistical Methods for Evaluation of Revegetation Success on Wyoming Coal Mines.

10. Page RP-17. Section RP.6.4.1. Please remove the first sentence in the third paragraph. It appears in conflict with the next sentence which cites Ch. 4.Sec. 2(d)(ii)(B).

11. Page RP-19. Section RP.6.4.5.1. Please add a third sentence to the first paragraph to Pastureland land use with a full shrub density greater than 1 shrub/m^2 is also eligible.

12. Page RP-24. Please revise the sentence after the • Shrub density bullet to "Additionally, a species list will be prepared" and delete the remainder of the sentence.

13. Page RP-25. Section RP.6.7.3. Under Sampling Frequency in Guideline 14 the third sample may be included as part of your revegetation success (bond release) sampling which can begin in year seven. You may add more flexability to your sampling interval such as beginning year 3 or 4, with the second sampling in year 5, 6 or 7 and then the third may be year 7 – 13 and may be used for revegetation success.

14. Page RP-29. Section RP.7.2. There is a reference to RP.8 in this section. Please correct the reference if it is not correct.

15. Table RP6.1. Could you please add a footnote listing the disturbances that are included in the 87.3 acres of Disturbance and what the disturbances will be postmining in the 56.1 acres.

16. Exhibit RP.2-1. Postmining the landuse will be Grazingland and Fish and Wildlife Habitat (937.7 acres) and Cropland (3.7 acres) with 56.1 acres of disturbance, 4.9 acres of water and 11.6 acres of wetland. These landuses will match the landuses on Exhiit D1.1-1. With just minor acreage changes shown in Table RP.6-1. Since the railroad and major roads are identified and Taylor Quarry is going to be reclaimed to Grazingland and Fish and Wildlife Habitat, the Industrial commercial stippling is not needed on these areas.

sp\

xc: Cheyenne File

MEMORANDUM

TO: File, Brook Mining Company, LLC, Brooks Mine Permit Application, TFN 62/025

FROM: Kim Medina, Project Geologist, LQD District III

DATE: January 12, 2015

SUBJECT: Round 1 Technical Review

Technical Review Comments – Appendix D5, Topography, Geology and Overburden Assessment

1. Geologic cross-sections should present other lithology of concern, such as aquitards or aquifers across the permit area. Please review the geology of the area to assess whether lithology of hydrologic concern should be presented on the cross-sections.

2. Page D 5-9 refers to samples collected from roof and floor from "many" locations throughout the permit area. However, supporting documentation appeared to be from only two borings and included two roof and one floor sample. In addition, the laboratory noted the floor sample did not have sufficient length and a correction factor was used to determine unconfined compressive strength. Additional structural analysis of the overburden, interburden and floor is required.

3. Please provide a discussion of the structural analysis of the overburden and interburden. The discussion shall address the potential for subsidence during and after mining.

4. Please discuss the aquifer(s) below the lowest coal seam and the potential for mining to impact these aquifer(s).

Technical Review Comments – Appendix D6, Hydrology

1. Page D6-12: Application states "detailed cross sections of the permit area geology shown in Appendix D5"; however as discussed previously the cross sections only showed the stratigraphy of the coal seams throughout the permit area. General lithology was not shown.

2.

addressed by Bj Kristiansen. Please see comment No. 65.

3. The groundwater elevation for the Carney coal seam in monitor well 578417-CRN was given as 3795.59. The potentiometric contour for 3800 is drawn south of this monitor well. Please correct the contour line to be consistent with the groundwater elevation shown for monitor well 578417-CRN. Correction of this contour line may also adjust how the contour lines for 3780 and 3760 are drawn, such that they may be drawn consistent with other contour lines.

4. Page D6 8-8: The text refers to the pump test in the Carney coal seam. According to the procedures in the previous section, transducers were placed in CRN and CRN-OB; however on the referenced page, it states transducers remained in MST and MST-OB after pumping. LQD believes this to be a typographical error.

5. Please discuss why the water levels rose in the Carney coal seam during the pump test in the Masters coal seam.

6. What effect would a leaking pump have on the results of the pump test in the Masters coal seam?

7. Please make sure all maps that are stamped are also signed and dated by the engineer, as required by regulation.

MEMORANDUM

TO: Bjarne Kristiansen, LQD District III

CC: TFN 6 2/025

FROM: Matt Kunze, LQD Division Services

DATE: March 12, 2015

SUBJECT: First Round Alluvial Valley Floor (AVF) Comments on Brook Mine New Permit Application (TFN 6 2/025)

The following are comments related to AVF sections (Appendix D11, Mine Plan, Reclamation Plan) of the Brook Mine permit application.

Appendix D11-AVF

Section D11.1 Introduction

1. In the second paragraph on Page D11-1, the possible impacts of the proposed mining operation on the Tongue River AVF are dismissed because the area is planned for facilities level disturbance only. However, the groundwater model (Mine Plan Addendum MP-3) predicts drawdown in the Tongue River alluvium, thereby possibly affecting the AVF. As discussed in subsequent comments, additional analysis and monitoring is needed to comply with LQD Coal Rules and Regulations regarding AVFs. (MDK)

Section D11.2 Purpose and Scope

2. On Page D11-2, please change "Wyoming Reclamation Act" to "Wyoming Environmental Quality Act". (MDK)

Section D11.3 Stream Laid Deposits

3. For identification of unconsolidated stream laid deposits, LQD Guideline No. 9 (AVF) lists two items that may be used to positively identify unconsolidated streamlaid deposits: (1) channel bars, splays, abandoned meanders, modern flood plains, or terraces, and (2) bedload or washload sediment deposited or transported in a nonbedrock channel bottom. Presumably, item (2) would be met at the streams identified within the AVF study area. However, the permit application does not address whether the channels contain geomorphic features from item (1). Please address in the text whether channel bars, splays, abandoned meanders, modern flood plains, or terraces are observed within the streams within the AVF study area. (MDK)

4. On Page D11-5, the conclusion that the materials in Hidden Water Creek valley do not meet the definition of unconsolidated streamlaid deposits, is in conflict with the conclusion from the Big Horn Mine Permit. The Big Horn Mine Permit

(Appendix D6, Pages D6-151 to D6-158) describes the evaluation of unconsolidated streamlaid deposits on lower Hidden Water Creek. The permit states: "*The conclusion verified from the pit observations is that these deposits are unconsolidated and stream laid. Small isolated patches of colluvium or bedrock can be found throughout the alluvial deposits, but these characteristics do not exclude the deposit from being stream laid.*" Please evaluate the data and findings from the Big Horn Mine Permit before a conclusion is drawn about the absence of unconsolidated streamlaid deposits on Hidden Water Creek. (MDK)

5. The Big Horn Mine Permit also describes subirrigation and flood irrigation studies on lower Hidden Water Creek and concludes: "*Due to the lack of subirrigation and extremely low potential for flood irrigation, Hidden Water Creek is not an alluvial valley floor.*" Although this is in the approved mine permit, it does not appear that an explicit AVF determination for Hidden Water Creek was ever issued by the LQD, and the AVF findings in the SDDs for the Big Horn Mine Permit do not mention Hidden Water Creek. The Brook Mine Permit application should incorporate these previous AVF studies on Hidden Water Creek into Appendix D11. (MDK)

Section D11.4.2 Extent of Subirrigation

6. On Page D11-6 it is stated the three monitor wells were installed along the thalweg of Slater Creek. The transects in Exhibit D11.3-2 show that two of the wells (578513-AL and 578418-AL) are not along the thalweg but are rather upgradient of the channel. Please revise this description in the text. (MDK)

7. It appears that from Exhibit D11.1-1 that subirrigation is occurring on Earley Creek within the AVF study area. Please explain why subirrigation was not mapped on Earley Creek. (MDK)

8. On Page D11-6, second paragraph, the alluvial/colluvial potentiometric surface is dismissed as a source of subirrigation along Slater Creek. However, the other hydrologic processes responsible for the subirrigation are not identified. Please discuss in the text why subirrigation is occurring along Slater Creek. (MDK)

9. The cross-sections in Exhibit D11-3-2 would be improved if the active channel and any floodplains or terraces were shown. A description of the materials in the active channel bottom would also help identify unconsolidated streamlaid deposits. (MDK)

Section D11.4.3 Extent of Natural and Artificial Flood Irrigation

10. In Exhibit D11.4-1, the extent of irrigated lands shown in Sections 2 and 11 along Slater Creek may not be correct. According to the summary for the Hart Brothers Ditches water right (permit 1317) in the SEO database, the land being irrigated under the water right has decreased to 23 acres:

THIS FACILITY IS MADE UP OF TWO DITCHES. THE WEST DITCH HAVING A POINT OF DIVERSION IN LOT 2 AND THE EAST DITCH HAVING A POINT OF DIVERSION IN THE SENE OF SECTION 3, T57N, R85W. T57N, AND 58N, R85W HAS BEEN DEPENDENTLY RESURVEYED. REQUEST FROM PADLOCK RANCH TO ELIMINATE 67 ACRES AS FOLLOWS: 32 ACRES IN THE SWSW OF SECTION 2 - 30 ACRES IN THE NENW AND 5 ACRES IN THE NWNW OF SECTION 11 ALL IN T57N, R85W, RECEIVED AND GRANTED. REQUEST OF ELIMINATION AND PROOF OF OWNERSHIP FILED IN MISCELLANEOUS NOTICES. ADJUDICATED WITH H.H. WILLIAMS AS APPROPRIATOR. PERMIT RECORD REFLECTS SOURCE AS SLATER CREEK AND WATER STORED IN THE HART BROTHERS RESERVOIR, P60R, XR7825A, HOWEVER CERTIFICATE RECORD REFLECTS .91 CFS FOR THE IRRIGATION OF 64 ACRES. BOC PETITION II 89-4-2 BY PADLOCK RANCH WAS GRANTED TO ISSUE AMENDED CERTIFICATE C77/290A TO REDESCRIBE LANDS WITHOUT CHANGING LAND TOTALS AND TO CHANGE POINT OF DIVERSION FROM THE RECORD POINT IN THE NWNE AND SENE OF SECTION 3, 57N, R85W AND PARTIAL MEANS OF CONVEYANCE FOR 41 ACRES (.59 CFS) TO THE WILLIAMS DITCH, P8710D, C77/289A DIVERTING WATER FROM SLATER CREEK IN THE SESW OF SECTION 34, T58N, R85W AS RECORDED IN ORDER RECORD BOOK 36, PAGES 385-390 AND RECEIVED ON CD3/578A. THIS LEAVES 23 ACRES STILL IRRIGATED UNDER THIS PERMIT. LANDS SHOWN BELOW AS "AME" AND "ELI" ARE THOSE ORIGINALLY DESCRIBED UNDER THIS DITCH.

Please clarify the irrigated acreage status for the Hart Brothers Ditches water right with the SEO and revise Exhibit D11.4-1 accordingly. (MDK)

Section D11.4.4 Water Quality

11. On Page D11-7, it is not necessary to mention the State of Montana water quality classifications of the Tongue River, as only State of Wyoming classifications and standards would apply. Please remove reference to the Montana standards. (MDK)

Section D11.4.5 Agricultural Practices

12. On Page D11-8, second paragraph, it states that Exhibit D11.1-1 shows that sufficient water supply does not exist for consistent agricultural practices in East Fork Earley Creek. However, Exhibit D11.4.1 shows a point of diversion for Earley Creek Ditch No. 1 and several areas of irrigated lands less than 40 acres in East Fork Earley Creek. As documented in Addendum D11-4, there is an adjudicated water right for irrigation in this location. So there *may* be sufficient water supply for consistent agricultural practices. The text needs to further expand on this discussion of East Fork Earley Creek since there is an adjudicated water right for irrigation. (MDK)

13. On Page D11-8, last paragraph, it states that the hay meadows along Slater Creek in Sections 2 and 11 are not within the boundaries of subirrigation or natural flood irrigation.

    (a) The areas symbolized as irrigated lands in Exhibit D11.4-1 do not necessarily correspond to hay meadows, as the imagery shows hay meadows in the

SWNE, SENE, and NESE of Section 11, and the NWSW of Section 12. The hay meadows appear to correspond with the area mapped as "AG" in the Vegetation Map (Exhibit D8.2-1) in Addendum D8.

(b) The irrigated area shown in Exhibit D11.4-1 near the Landen Ditch does overlap with subirrigation mapped in Exhibit D11.1-1.

Please re-evaluate the area of hay meadows along Slater Creek and revise the text accordingly. Comments No. 15 and 16 below also relate to this issue. (MDK)

14. On Page D11-8, last paragraph, it states that, besides Hart Bros Ditches, the remaining portion of the Slater Creek valley does not contain SEO water rights. This is not the case as Exhibit D11.4-1 shows Landen Ditch in the NENW of Section 11. This water right (P11695) does not appear in Addendum D11-4. Please revise the text and add this water right to Addendum D11-4. (MDK)

15. The irrigated acreage for the Landen Ditch water right appears to be 18 acres for one point of use and 22 acres for a second point of use. Please add these areas to Exhibit D11.4-1. (MDK)

16. The Hall Ditch (SEO Permit 5195), mapped in Section 11 of Exhibit D11.4.1, apparently provides irrigation water for hayfields in the NESE of Section 11 (30 acres) and the NWSW of Section 12 (22 acres). This water right does not appear in Addendum D11-4. Please add this water right to the Addendum and add the irrigated acreages to Exhibit D11.4-1. (MDK)

Section D11.6 Extent of Alluvial Valley Floor

17. Portions of Earley Creek and East Fork Earley Creek are within the AVF study area yet the permit application does not attempt to conclude if these streams contain AVFs. Presumably, the LQD will need to make an AVF finding on these streams. (MDK)

18. The first bullet for Slater Creek on Page D11-9 dismisses the positive identification of unconsolidated stream laid deposits because a layer of colluvial material was found over alluvial material. However, as stated in Appendix D5 on Page D5-8 and Page D5-9, sub-rounding of the clinker present in the cuttings suggests water driven deposition of limited extent. Also, as discussed in Comment No. 3, the application did not evaluate unconsolidated streamlaid deposits in a manner that is consistent with identification criteria listed in LQD Guideline No. 9. The application has not provided sufficient evidence that unconsolidated stream laid deposits are not present along Slater Creek. (MDK)

19. The third bullet on Page D11-9 for Slater Creek should be clarified that the width of **natural** flood irrigation in the valley is generally insufficient to provide for

economic agricultural practices. However, economic agricultural practices clearly occur immediately upstream of the proposed mine permit boundary because of **artificial** flood irrigation of hayfields adjacent to the channel. These practices are documented by existing water rights that are approximately 100 years old. Please revise this discussion. (MDK)

20. The fifth bullet for Hidden Water Creek on Page D11-9 seems to dismiss the positive identification of unconsolidated stream laid deposits because of colluvial material with shallow bedrock. However, as previously noted, this conflicts with information in the Big Horn Mine permit concerning unconsolidated stream laid deposits on Hidden Water Creek. (MDK)

Section D11.7 Mining of Alluvial Valley Floor

21. Although the LQD has not yet issued its formal finding, the segment of the Tongue River adjacent to the proposed permit area, which was not declared under previous LQD findings, likely contains an AVF.

(a) If this AVF is significant to farming, the applicant must comply with LQD Coal Rules and Regulations Chapter 3, Section 2(d)(ii) and demonstrate that the proposed mining operations will not materially damage the quantity and quality of water that supplies the Tongue River AVF. The absence of direct mining on the Tongue River AVF does not relieve the requirement of assessing the probable hydrologic impacts of the proposed operation to the AVF, particularly since the groundwater model in Mine Plan Addendum MP-3 predicts drawdown in the Tongue River alluvium. (MDK)

(b) Regardless of the significance to farming, the applicant must also maintain and/or restore the essential hydrologic functions of the Tongue River AVF. The applicant must therefore identify the essential hydrologic functions of the Tongue River AVF and either (1) provide an analysis that the proposed operation will not hamper the essential hydrologic functions, or (2) demonstrate that the essential hydrologic functions will be restored. The essential hydrologic functions for another part of the Tongue River AVF are described in the Big Horn Mine Permit SDD (shown in Brook Mine Appendix D11 on Page Addendum D11-2-27), so this may be a good starting point to consider. (MDK)

(c) A monitoring system is also required to demonstrate the essential hydrologic functions are maintained, as per LQD Coal Rules and Regulations, Chapter 5, Section 3(b)(ii). Since the groundwater model (Mine Plan Addendum MP-3) predicts 2.5 feet of drawdown in the Tongue River alluvium, the monitoring system may likely contain alluvial monitoring wells and periodic evaluation of color-infrared imagery. (MDK)

22. The essential hydrologic functions of the adjacent Goose Creek AVF must also be maintained during the proposed mining operation. The application needs to list these functions, as described in the Big Horn Mine Permit SDD (shown in

Brook Mine Appendix D11 on Page Addendum D11-2-27). A monitoring system is also required to demonstrate that the essential hydrologic functions will be maintained. (MDK).

Mine Plan
Section MP.20 Alluvial Valley Floors

23. The discussion of underground mining in AVFs does not seem necessary given there is no plans for underground mining at the Brook Mine. Furthermore, it is conceivable that circumstances could exist where underground mining of an AVF would not be allowed by the LQD. For example, if the AVF was significant to farming and underground mining of the AVF would result in surface effects such that material damage to the AVF would occur. (MDK)

Reclamation Plan
Section RP.10 Reestablishment of Essential Hydrologic Functions and Agricultural Utility on Alluvial Valley Floors

24. Assuming the Tongue River is an AVF, this section should discuss how the essential hydrologic functions will be maintained and/or reestablished, as required by LQD Coal Rules and Regulations, Chapter 5, Section 3(c)(ii). As noted in Comment No. 21, the essential hydrologic functions of the Tongue River AVF need to be identified and a monitoring system needs to be installed. (MDK)

25. As noted in Comment No. 21, the adjacent Goose Creek AVF also needs a monitoring system to demonstrate essential hydrologic functions are maintained and/or reestablished as required by LQD Coal Rules and Regulations, Chapter 5, Section 3(c)(i) and (ii). (MDK)

26. This section may also need to be addressed if the LQD finds that other AVFs exist on or near the permit area. If AVFs are determined to be present, the essential hydrologic functions must be maintained and/or reestablished as required by LQD Coal Rules and Regulations, Chapter 5, Section 3(c)(i) and (ii). (MDK)

MEMORANDUM

TO: Bjarne Kristiansen, LQD District III

CC: TFN 6 2/025

FROM: Matt Kunze, LQD Division Services

DATE: March 10, 2015

SUBJECT: First Round Comments on Brook Mine New Permit Application (TFN 6 2/025)

As requested by your November 13, 2014 memorandum, I have performed a review of surface water items in the new Brook Mine permit application (TFN 6 2/025). I have reviewed Appendix D6 (Hydrology), Mine Plan, and Reclamation Plan. I have one comment for Appendix D10 (Wetlands). I also have some comments that were generated in advance of preparing the Cumulative Hydrologic Impact Assessment (CHIA) for the permitting action.

Items Requested in Electronic Format for Preparation of CHIA

1. Please provide a CAD or ArcGIS shapefile that contains the proposed permit boundary for the Brook Mine. This file will be used to prepare maps in the CHIA. This file can be emailed to: matthew.kunze@wyo.gov. (MDK)

2. Please provide the baseline surface and groundwater data collected to support baseline characterization for the permit application. All data can be submitted on Excel templates (Attachments) found on the LQD website for the Coal Annual Report Format (CARF): http://deq.wyoming.gov/lqd/coal/resources/annual-report-3/.

    - Please provide all surface water flow and water quality data for the following surface water stations: SM578415-SW-1, SM578409-SW-1, SM578418-SW-1, and SM578512-SW-1.

    - Please provide all groundwater level and water quality data for all Brook Mine monitoring wells shown in Table D6.2-1.

Appendix D6-Hydrology

Section D6.1.2 Drainage Basin Description

3. On Page D6-2 it is stated that Slater Creek is an ephemeral stream. Aerial imagery shows a riparian area with trees and subirrigation occurring along much of the channel. PEM wetlands are also present as documented in Appendix D10. It would seem that an ephemeral stream may not be able to support these features. Please provide the justification why Slater Creek is considered an ephemeral stream, and that the stream does not contain intermittent characteristics where it is not below the local water table for a portion of the year. (MDK)

Section D6.1.3.2 Flood Studies

4. The USGS operated a peak flow gage on Slater Creek from 1967 to 1981 (Station No. 06299900, http://nwis.waterdata.usgs.gov/wy/nwis/inventory/?site_no=06299900&agency_cd=USGS). The gage was located just downstream of the proposed permit boundary near the confluence with the Tongue River. Please incorporate the annual peak flow data from this station into the permit application to illustrate the range of peak flows that might be expected from Slater Creek. (MDK)

5. Some of the U.S. Army Corps of Engineers references cited in the text (2000, 2001) do not appear in the References Section (Section D6.3). Please add these to the references list. (MDK)

6. Please add the year to the Miller reference within the text (2003) and add this citation to the references list in Section D6.3. (MDK)

7. Please explain in the text if the existing impoundments (stock reservoirs, old mine pits, etc.) in both the Slater Creek and Hidden Water Creek drainages were considered in the routing functions for the HEC-HMS runoff estimates. These features would likely have an effect on attenuating peak flows. (MDK)

8. As the text states on Page D6-5, the HEC-HMS runoff estimates in Table D6.1-7 are higher than the Miller (2003) equation estimates. Please provide a discussion in the text as to the reasonableness of the HEC-HMS estimates and why the HEC-HMS estimates are so much higher than the Miller (2003) equation estimates.

   The Miller (2003) equation for this region used, in part, data from the USGS peak flow gage on Slater Creek, so it would seem that the Miller (2003) estimates may be more reasonable. For example, compared to the HEC-HMS estimates, the 15-year record from the peak flow gage on Slater Creek would not register at anything greater than a five-year event. Furthermore, the May 18, 1978 event on Slater Creek resulted in a peak flow of 1,100 cfs, which according to the HEC-HMS estimates would only be around a 2-year event. USGS studies have shown that the May 1978 flood event was estimated to be a 100-year event on some

parts of the Tongue River in this area (http://pubs.usgs.gov/pp/1244/report.pdf). (MDK)

Section D6.1.5.1 Monitoring Stations

9. Please add the northing/easting State Plane coordinates for the four Brook Mine surface water monitoring stations to Table D6.1-11. (MDK)

10. On Page D6-8, it is not necessary to mention the State of Montana water quality classifications of the Tongue River, as only State of Wyoming classifications and standards would apply. Please remove reference to the Montana standards. (MDK)

11. On Page D6-8, second paragraph, it states that increased *E.Coli* from samples collected in 2006 were attributable to high flows in May-June 2010. Were the samples also collected in 2010 and not 2006? Please revise this sentence. (MDK)

12. On Page D6-8, second paragraph, it would be informative to add that, in addition to the SCCD, other entities such as the Big Horn Mine, USGS, and WDEQ/WQD have collected water quality data on the Tongue River and Goose Creek near the proposed mine. It may also be informative to mention that sections of the Tongue River in the vicinity of the proposed mine are on the State's 303(d) list since certain uses are not supported due to impaired water quality. Goose Creek has also been on the 303(d) list in the past and a TMDL has been prepared. Information can be found at: http://deq.wyoming.gov/wqd/water-quality-assessment/resources/reports/ and http://deq.wyoming.gov/wqd/tmdl/. (MDK)

Section D6.1.5.2 Surface Water Quantity

13. The Big Horn Mine (WDEQ/LQD Permit 213) operated a station on Hidden Water Creek (HWC1-79) from 1979 to 1998. This station was located approximately ¼ mile upstream from station SM578415-SW-1 that was installed by the Brook Mine. The LQD Hydrology Database contains mean daily flow data from this station from 1982 to 1997, although several years are missing data. Baseline water quantity characterization of Hidden Water Creek in the Brook Mine permit application would be strengthened if these data were incorporated and discussed. The LQD can provide these data in electronic format upon request or a more complete dataset may be available if requested from the Big Horn Mine. (MDK)

Section D6.1.5.3 Surface Water Quality

14. Please briefly discuss in the text the water quality results from Slater Creek in the context of WQD Surface Water Quality Standards for Class 3B waters (see Chapter 1 of WQD Rules and Regulations). This would reveal whether or not designated uses were being met prior to mining. The two samples from Slater

Creek indicate no exceedences of Class 3B criteria, indicating uses are supported. (MDK)

15. It is understood that water was not flowing in Hidden Water Creek so the applicant could not collect a sample for baseline purposes. However, as previously mentioned, the Big Horn Mine operated a station on Hidden Water Creek (HWC1-79) from 1979 to 1998. The LQD Hydrology Database contains nine water quality samples collected at this site from 1979 to 1989. Baseline characterization of Hidden Water Creek in the Brook Mine permit application would be strengthened if these data were incorporated and discussed. The LQD can provide these data in electronic format upon request. (MDK)

Section D6.1.5.4 Sediment Transport

16. This section would be enhanced by including data from a single sediment sample collected on Slater Creek at USGS Station No. 06299900 (peak flow gage previously discussed in Comment No. 4). This sample was collected in June 1967 at a flow of 18 cfs. The TSS was 11,600 mg/L and the suspended sediment discharge was 564 tons/day. (MDK)

Addendum D6-5 – Rating Curves

17. A rating curve developed using only the Manning equation will provide only a rough estimate of flows given the uncertainty in the Manning's roughness coefficient. It is recommended that direct discharge measurements also be taken over time to help evaluate the rating curves developed for the four monitoring sites. (MDK)

18. Given the uncertainty in the Manning equation, the estimated flow rates provided in Table D6-3 and Attachment D6-5-A (Rating Tables) are reported at much too high a level of precision to be meaningful. Depending on the magnitude of the flow estimate, there should be only one or two significant figures provided. For example, 0.29 cfs = 0.3 cfs and 3,584.38 cfs = 3,600 cfs. Please revise these tables. (MDK)

Appendix D10-Wetlands

Section D10.2 Results

19. The text may want to state when (what date) RAMACO requested the jurisdictional determination from the USACE, and include this request letter as an Addendum to Appendix D10. This would provide documentation that the request was submitted, as receipt of the USACE determination may lag behind the LQD permitting process. (MDK)

Mine Plan

Section MP.4.1 Mining Sequence

20. On Exhibit MP.4-1, please attempt to show the areas that would be highwall mined versus surface mined. These layers are currently not found until Exhibit MP.15-1. Alternatively, the text in this Section could specify that the areas to be highwall versus surface mined are shown in Exhibit MP.15-1. (MDK)

Section MP.5.1 Surface Drainage and Erosion Plan

21. Only Slater Creek and Hidden Water Creek are labeled and shown in Exhibit MP.5-1. In order to better evaluate the Hydrologic Control Plan, please provide labels and locations for the other stream channels, including Tongue River, Goose Creek, East Fork Earley Creek, and the other unnamed channels (as shown on the USGS 24K Quad) on the proposed permit area. (MDK)

22. Exhibit MP.5-1 shows overburden stockpiles OB-13 and OB-12, as well as topsoil stockpile TS-6, occurring directly over the Slater Creek channel. The Exhibit does not show any diversion ditches to be used in these locations. Please either move the location of the stockpiles or present a plan to use a diversion to route Slater Creek around the stockpiles. (MDK)

Section MP.5.2 Sedimentation and Wastewater Impoundments

23. Exhibit MP.5-1 shows the locations of two "sediment basins". Are these considered the same as "sedimentation impoundments", as discussed in this Section? If so, the designs for these two impoundments are not found within the Mine Plan. (MDK)

Section MP.5.3 Flood Control

24. This section discusses flood control reservoirs but it is not mentioned how many flood control reservoirs would be constructed and where their locations would be. Please provide this information to comply with LQD Coal Rules and Regulations, Chapter 2, Section 5(a)(i)(D)(IV). (MDK)

Section MP.5.4 Diversions

25. This section mentions permanent diversions, but there are no apparent plans for permanent diversions. Please discuss if permanent diversions are anticipated as part of the mining operation, or if all diversions will be temporary. (MDK)

26. Exhibit MP.5-1 shows only one diversion ditch for Hidden Water Creek in T57N, R84W, Section 9. Please discuss this particular diversion and its typical design in more detail in Section MP.5.4. (MDK)

Section MP.5.5 Culverts

27. Please provide a brief statement that commits to a periodic culvert inspection and maintenance plan to ensure that culverts will function properly over time. (MDK)

Section MP.5.8 Mine Pit Dewatering Plan

28. The first sentence references a sedimentation reservoir. Where is the location of this sedimentation reservoir? Are these the "sediment basins" shown in Exhibit MP.5-1? If not these sedimentation reservoirs need to be added to this Exhibit. (MDK)

29. The first paragraph references treating and discharging pit water. Please also reference in the text that appropriate WDEQ/WQD discharge permits (e.g., WYPDES) will be obtained prior to any discharge. (MDK)

Section MP.6.1 Surface Water

30. Exhibit MP.1-1 shows surface disturbance directly over a few areas of Slater Creek and Hidden Water Creek. Please identify the source of disturbance in these areas. Direct disturbance of the channel should be avoided unless there is a plan for a diversion to route the stream around the disturbance. (MDK)

31. The mining trenches are often discussed with reference to Exhibit MP.1-1. However, the trenches are not shown on this Exhibit. Please add the locations of the trenches to Exhibit MP.1-1. (MDK)

32. On Page MP-39, in the first carryover paragraph from the previous page, it states that any surface runoff to come in contact with mining disturbance will be treated prior to discharge. Please also reference in the text that appropriate WDEQ/WQD discharge permits (e.g., WYPDES) will be obtained prior to any discharge. (MDK)

33. Please discuss the diversion ditch for Hidden Water Creek in the first carryover paragraph on Page MP-39. (MDK)

34. On Page MP-40, in the first carryover paragraph from the previous page, it states that any surface runoff to come in contact with mining activities will be treated prior to discharge. Please reference in the text that appropriate WDEQ/WQD discharge permits (e.g., WYPDES) will be obtained prior to any discharge. (MDK)

35. On Page MP-40, there is a sentence: "The surface disturbance activities will have temporary impacts on Slater Creek geomorphology including ground cover and soil erodibility". This statement is unclear. Are the impacts to the actual Slater Creek channel or the uplands and other tributaries in the watershed? Is it *reduced* ground cover and *increased* soil erodiblity? Please provide a more explicit description of the possible impacts. (MDK)

36. Please provide a discussion on whether the proposed mining operation would affect surface water quality such that designated uses would be affected on the major streams on and adjacent to the proposed permit area. (MDK)

37. The text describes possible reductions in peak flows and storm volumes. Please describe in the PHC if the proposed mining operation will have any effects on nearby or downstream surface water rights. (MDK)

38. Please add a brief statement to the PHC that if it is determined that the mining operation affects a surface water right, that water right would be replaced with a water source of similar quantity and quality as provided by W.S. § 35-11-415(b)(xii). (MDK)

Section MP.6.1.1 Land Erosion Stability

39. It is unclear the intent of this section. It seems to be out of place in the mine plan, as it discusses the USLE in the context of only native and reclaimed conditions. Furthermore, no data other than the K factors are presented in Mine Plan Tables (Table MP.6.1). The Reclamation Plan also does not discuss applying the USLE, so it would seem that Section MP.6.1.1 should be removed unless a USLE analysis is completed of pre- vs during- vs postmine erosion predictions. (MDK)

Section MP.7.1 Surface Water Monitoring

40. It is unclear why reservoirs will be monitored in the operational monitoring program when these features were not sampled for during baseline characterization. If the reservoirs have the potential to be affected by the mining operation they should be sampled prior to mining with this information presented in Appendix D6. (MDK)

41. Please add the reservoir monitoring locations listed in Table MP.7-1 to Exhibit MP.7.1. (MDK)

42. Please add the northing/easting State Plane coordinates for the surface water monitoring stations to Table MP.7.1. (MDK)

43. Please identify what type of water quantity data will be generated from the continuous stage monitoring. For example, will mean daily flow rates and/or

peak daily flow rates be estimated, as these would likely be submitted to the LQD in the Annual Report? (MDK)

44. The text in the last paragraph on Page MP-45 states that water quality samples will be collected from a single station using an ISCO automatic sampler. Please identify in the text which station this is. Also, please explain the rationale for using an ISCO sampler at only one of the four stream monitoring sites. (MDK)

45. The text in the first paragraph on Page MP-46 states that data will be evaluated to determine if any surface water and groundwater interactions exist. It would seem that any interactions should have already been identified during the baseline characterization of the hydrological system on and near the proposed permit area. It does not appear that the permit application discusses surface/groundwater interactions. (MDK)

Section MP.8 Water Use

46. Please state in the text that all water from surface reservoirs or wells will be used under appropriate permits from the State Engineer's Office (SEO). (MDK)

47. It is advised that the applicant discuss with the SEO-Interstate Streams Division any implications that water use may have under the Yellowstone River Compact. (MDK)

Addendum MP-6 Subsidence Control Plan

Section MP.6.3 Subsidence Monitoring and Assessment and Section MP-6.4 Subsidence Control and Remediation

48. The text states that subsidence monitoring would be discontinued if no evidence of subsidence occurred after six months after highwall mining. Please include a clarifying statement that the applicant would remediate subsidence up until bond release is approved, even if the subsidence was detected later than the six months of initial monitoring. (MDK)

Reclamation Plan

Section RP.3.3 Postmine Slope Analysis

49. Please provide a discussion that compares the pre-mine vs. post-mine slope characteristics. A table would be helpful that compared the minimum, maximum, and average slopes under pre-mine and post-mine conditions. (MDK)

Section RP.3.5 Drainage Reestablishment

50. It is stated that mining will disturb portions of the Slater Creek channel and the reclamation will entail reconstruction. However, the Mine Plan PHC (Section

MP.6.1) stated that Slater Creek "will still flow naturally around the trench", and "Because Slater Creek's flow will not come into contact with mining activities, no impact will be made to water quality". Please provide a clear and explicit description of the extent of direct disturbance to the Slater Creek channel. This description should be consistent between the Mine Plan and Reclamation Plan. (MDK)

Section RP.4.2 Mitigation of Unsuitable Material

51. Minor channels are defined as ephemeral streams but there is no definition provided for "major channels". Please provide a definition and also illustrate an example of a major channel within the proposed permit boundary that would fit into this category. (MDK)

Section RP.5.6 Erosion Control and Conservation Practices

52. The first sentence of the second paragraph..."Rills and gullies..." needs revised, as it appears to be missing one or more words. (MDK)

Section RP.7.4 Aquatic Habitat

53. The second sentence discusses stockponds possibly being disturbed by mining activities. The Mine Plan PHC did not mention that any existing stockponds would be disturbed by mining activities. If stockponds are to be disturbed by the mining operation, this should be discussed in the Mine Plan PHC. (MDK)

54. The text states that two additional postmine impoundments will be constructed and their location is shown in Exhibit RP.3-1. This Exhibit shows ten permanent impoundments, both on and adjacent to the proposed permit area. Please revise this discrepancy in the text or change the symbology in the Exhibit to clearly show the two permanent post-mine impoundments. (MDK)

Section RP.8.1 Drainage Basin Reconstruction

55. Please add the major stream name labels (Tongue River, Goose Creek, East Fork Earley Creek, Slater Creek, Hidden Water Creek) to Exhibit RP.8-1. (MDK)

56. Please explain in the text how the postmine drainage basin parameters in Table RP.8-1 were determined. (MDK)

57. The text states that a comparison of drainage basin parameters in Table RP.8-1 and Exhibit RP.8-1 show that the overall hydrologic balance will remain largely unchanged. This conclusion is not obvious from the Table and Exhibit. How similar are the postmine drainage basin parameters to the pre-mine parameters? Which sub-drainages show the largest change from pre-mine conditions? The text needs to include a more thorough discussion to demonstrate to the reader why exactly the postmine hydrologic balance will be unchanged. (MDK)

Section RP.8.1.1 Discharge Estimates

58. The text provides no discussion of the comparison between the pre-mine and postmine modelled discharge values. Please provide this discussion so the reader can determine if the differences are minor or major. (MDK)

59. Please add the year to the Miller reference within the text (2003) and add this citation to the references list in Section RP.17. (MDK)

60. Similar to Comment No. 8 made for Appendix D6, the HEC-HMS runoff estimates in Table RP.8.4 are much higher than the Miller (2003) equations. Please provide a discussion in the text as to the reasonableness of the HEC-HMS estimates and why the HEC-HMS estimates are so much higher than the Miller (2003) regression equations.

Section RP.8.1.2 Channel/Floodplain Design

61. The last sentence in the first paragraph states that stream reaches for which designed cross sections are provided are identified in plan on Exhibit RP.8-1. There is nothing on this Exhibit that shows which stream reaches have designed cross sections, nor which stream channels are being reconstructed. Please clearly identify this information on this Exhibit. (MDK)

62. Exhibit RP.8-2 shows that the main Slater Creek channel will not be disturbed. Please consider this in light of Comment No. 50 that requested clarification on the extent of disturbance to the Slater Creek channel. (MDK)

63. On Page RP-35, second paragraph, it references "reclaimed Slater Creek channel" and channel hydraulics are presented in Table RP.8-5. It is not clear why channel hydraulics are presented for Slater Creek when it will not be disturbed. Is this because reclaimed tributaries to Slater Creek are changing such that the main channel of Slater Creek is expected to be change? Please clarify this in the text. (MDK)

Section RP.8.2 Permanent Impoundments

64. It is unclear exactly how many new postmine impoundments will be constructed. Table RP.8-6 identifies two impoundments (Enhancement Stock Pond 1 and Replacement Stock Pond 1), and these are shown in Exhibit RP.3-1. Exhibit RP.3-1 shows eight other permanent impoundments. Please identify if these are new features to be constructed or if they are existing stockponds that may be affected by the mining operation. (MDK)

65. Please identify in this section if there will be a net increase or decrease in post-mine water storage capacity relative to pre-mine capacity. (MDK)

66. As mentioned Comment No. 47, it is advised that the applicant discuss with the SEO-Interstate Streams Division any implications for the Yellowstone Compact if new water storage features are proposed that potentially decrease water quantity to the Tongue River. (MDK)

Section RP.8.4.2 Surface Water Monitoring

67. The text on Page RP-40 states that the surface water monitoring stations are shown on Exhibit RP.8-4. However, the stations are not shown on this Exhibit. It may be make the most sense to add these to Exhibit RP.8-5 and rename the Exhibit "Postmine Hydrologic Monitoring Locations" so the surface water stations and monitoring wells are on one Exhibit. (MDK)

Section RP.8.4.3 Postmine Impoundments

68. The text on Page RP-41 states that water quality samples will be collected at each of the postmine impoundments listed in Table RP.8-6 and presented on Exhibit RP.3-1. Please clarify in the text that this sampling list includes all ten impoundments shown. (MDK)

69. Please add the list of impoundments to be sampled to Table RP.8-9 "Surface Water Monitoring Sites". (MDK)

70. The postmine impoundments to be sampled appears to be slightly different from the impoundments listed in Mine Plan Table MP.7-1 "Operational Surface Water Monitoring Locations". Table MP.7-1 lists three impoundments (Hall Reservoir, Black Mountain No. 1 Stock Reservoir, and Legerski Bros #1 Stock Reservoir) that are not listed as postmine impoundments to be sampled. Please explain why there is a difference in the operational monitoring and postmine monitoring of some impoundments. (MDK)

71. In the second full paragraph on Page RP-41, "The water quality samples.." please also state that the water quality samples will be compared against WDEQ/WQD Class III groundwater standards, as suggested by LQD Guideline No. 17 for replacement and enhancement stockponds. (MDK)

Section RP.8.5.2 Surface Water

72. At the end of the first paragraph on Page RP-44, it predicts a "slight change" in event peaks and volumes. Please further discuss what is meant by a "slight change", i.e., what is the magnitude of the increase or decrease? (MDK)

73. In the second paragraph on Page RP-44, please clarify the extent of direct mining disturbance to Slater Creek versus tributaries of Slater Creek. This comment relates to previous Comments No. 50 and 62. (MDK)

74. Please provide a discussion as to whether the planned postmine impoundments will affect surface water quantity on or downstream of the proposed permit area. (MDK)

Section RP.9.1 Introduction

75. The second paragraph references Appendix D8. Should this be Appendix D10 (Wetlands)? Please revise this if necessary. (MDK)

76. Please add a statement up front in the Wetland Mitigation section that the USACE has not yet issued a jurisdictional determination for the proposed Brook Mine. Please also provide a statement in the text that the information in Section RP.9 may be subject to change pending the USACE determination. The USACE jurisdictional determination should also be incorporated somewhere into the Mine Permit once that is received by the Brook Mine. (MDK)

Section RP.14 Bond Release

77. The LQD no longer requires a bond release verification for "sediment control release". This is now termed "surficial stability verification". More information is available in LQD Guideline No. 23. Please revise the text for this change. (MDK)

MEMORANDUM

TO: Bjarne Kristiansen, LQD District III

CC: TFN 6 2/025

FROM: Muthu Kuchanur, LQD Division Services

DATE: March 10, 2015

SUBJECT: First Round Comments on Brook Mine New Permit Application (TFN 6 2/025)

As requested by your November 13, 2014 memorandum, I have performed a review of groundwater items in Appendix D6, groundwater sections in mine plan and reclamation plan of the new Brook Mine permit application (TFN 6 2/025). In addition, I have provided a few comments on Appendix D5 for your consideration.

Appendix D5

Section D5.3.3.2 Overburden and Interburden

1. This section provides a discussion of the thickness of interburden and not overburden. Please provide a discussion (or a reference) on the thickness of the overburden. (MK)

Section D5.3.3.3 Coal

2. On Page D5-10, there is a good discussion about the thickness of the two coal seams. Please provide a description on the depth from land surface to these coal seams. (MK)

Section D5.3.3.3 Coal

3. Page D5-10 states, "Monarch seam exist within isolated portions of the mine areas as shown on the geologic cross sections in Addendum D5-3 and may present a secondary target." However, Table D5.3-2 does not provide the coal quality characteristics for Monarch coal seam. If monarch seam is part of the mine plan, please include the coal quality characteristics of Monarch coal seam in Table D5.3-2 and a description of thickness and depth from land surface.

4. Please include a discussion on Dietz (1, 2, 3) coal seams, if they are present in the mine permit boundary. If they are part of the mine plan, please include the coal quality characteristics in Table D5.3-2. (MK)

Section D5.3 Geology of Mine Area

5. Please provide a description of the stratigraphic units below the Masters coal seam. (MK)

Addendum D5-3 Geologic Cross Sections

6. Several of the geologic cross sections show UNK – unknown coal seam (Stringer). Please include a brief discussion about this stringer in Section D5.3.3.3 (MK)

Addendum D5-4 Isopachs

7. Please include the wells/drill holes (control points) used to interpret the isopachs and elevation contours in the maps. In addition, label all the control points with names and the thickness (or elevation, as appropriate). This comment is applicable to Addendum D5-4, Exhibits 1 through 8. (MK)

Addendum D5-5 Overburden, Roof and Floor Sample Analysis Table

8. Please describe these analyses, methodology, results and provide an interpretation of their applicability to the mine/reclamation plan. (MK)

Appendix D6

Section D6.2.1 Regional Hydrogeology

9. Page D6-12 states, "The potential groundwater in the formation as capable of yielding small quantities of water for domestic and stock use". Please consider providing a range of estimates for well yields based on literature review or from the baseline data collected by the Brook Mine. (MK)

10. The description in this section discusses only about the Fort Union formation. Please provide a description of the overlying and underlying water-bearing formations (aquifers) and describe their hydrogeologic characteristics (flow direction, gradients, aquifer properties, general outcrop locations) on a regional context. It is noted that some of the overlying formations may be dry or discontinuous within the mine permit boundary. (MK)

11. Page D6-12 states, "The overburden is comprised of sand lenses, clinker and alluvial that have the potential of water bearing bodies. Due to the topography in this area, the valley cut through these deposits. Therefore, they are discontinuous and would not hold large quantities of water." It is noted that they are discontinuous and would not hold large quantities of water. Please provide additional justification for this statement by using the hydrogeologic data

collected by the Brook Mine including any reference to the interpreted extent of dry zones based on drill holes, monitor wells and other applicable data. (MK)

12. Please clarify if there were groundwater springs or seeps observed in the areas within or adjacent to the mine permit boundary. Include a discussion (or reference) on the surface water - groundwater interactions.(MK)

Section D6.2.2.1 Monitor Well Construction, Completion and Development

13. Page D6-13 states, "No monitoring wells were completed in the overburden or interburden as no water was found in these units during drilling operations". This information is critical in demonstrating the overlying units are dry. Therefore, for better documentation, please provide (or reference) a map with all the drill holes (both overburden and interburden) and their depths that were used to make this determination. (MK)

14. Page D6-13 states, "Also one well 578409-MST-UB showed the presence of water in the underburden, while all the other wells drilled into the underburden were dry and therefore not completed as wells." Similar to the previous comment, this information is critical in demonstrating the underlying units are dry. Therefore, for better documentation, please provide (or reference) a map with all the drill holes (underburden) and their depths that were used to make this determination. (MK)

Section D6.2.2.2 Aquifer Tests

15. Page D6-15 states, "Alluvial materials were also not analyzed during the aquifer testing." The alluvial aquifer materials are one of the key factors in determining any impacts caused by mining to the alluvial aquifer. Alluvial aquifer tests will be helpful in understanding any surface water – groundwater interactions. Please provide justification for not conducting any aquifer tests in the alluvial wells. (MK)

16. Please provide justification for not observing the groundwater level reponses in the alluvial aquifer during the two aquifer tests conducted by Brook mine. (MK)

17. Page D6-16 states, "A report of these tests can be found in Addendum D6-8 and summary tabulation of the aquifer test results is included in Table D6.2.2". Please consider including a comparison of these estimated aquifer properties with the aquifer tests conducted in other similar coal seams in the Powder River Basin (Example: Bighorn Mine). Given the number of tests conducted by the mine, this will increase the robustness of the reported estimates from the two aquifer tests. (MK)

18. It is noted that the aquifer tests were conducted for ~640 minutes. Will an increased aquifer test duration change the observed lack of interaction between

the coal seams and the underburden? Please clarify with a brief description. (MK)

19. The referenced Addendum D6-8, Table D6-2 shows an increase in water levels in two of the Carney coal seam observation wells during the Masters coal seam well pumping test. Please provide an explanation for this increase in water levels during the aquifer test. (Noordbergum effect?). (MK)

20. Please provide a discussion (or reference) on the role of faults in the results of aquifer tests. (MK)

Section D6.2.2.4 Premining Potentiometric Surface

21. Please provide some additional discussion on the premining potentiometric surface maps, including ranges of estimated hydraulic gradients and groundwater velocity in the different coal seams/aquifers. (MK)

22. Please provide a discussion (or reference) on the hydrologic effects of any adjacent operations (including past coal mining activity by historic mines and Bighorn mine) on the premining information and data. (MK)

Section D6.2.2.5 Recharge and Discharge Areas

23. This section provides a good discussion on the recharge areas. However, please clarify if there are any discharges from the coal seams within the permit boundary. (MK)

24. Please provide a range of estimates for recharge from precipitation to the aquifers within the permit boundary. Also, provide a discussion if this is the primary recharge mechanism for the aquifers within the permit boundary. (MK)

25. Consider providing a description of the soil properties within the permit boundary and the use of these percent soil distributions in the discussion of infiltration within the permit boundary. (MK)

26. Page D6-18 states, "Collected groundwater elevation and hydrographs of the groundwater wells are found in Addendum D6-8". Please revise this statement to reference the correct addendum - Addendum D6-9. (MK)

Section D6.2.3 Baseline Water Quality

27. Page D6-20 states, "A piper diagram of the groundwater wells with measured values is presented in Figure D6.2-1. Please provide a discussion on the water quality types observed at each aquifer (Example: Is the water quality type

variable within an aquifer? If yes, explain the potential reasons for this observed variability) based on the piper diagram. (MK)

28. Page D6-20 states, "The constituents that most frequently exceed the standard concentration limitations are ammonia, TDS, sulfate and manganese". Please clarify if these constituents exceed the Chapter 8 standards at *all* the monitor wells. (MK)

Section D6.2.4 Groundwater Rights

29. Page D6-20 states, "Adjacent and on-site groundwater rights are listed in Appendix E2 in the Adjudication Volume." Cheyenne copy of the TFN does not have a sheet separator and a tab for Appendix E2 in the Adjudication volume. Please provide a sheet separator and tab for Appendix E2. (MK)

30. Page D6-20 states, "Adjacent and on-site groundwater rights are listed in Appendix E2 in the Adjudication Volume." Please provide a summary discussion/statistics on (i) total number of water rights, (ii) number of wells, (iii) aquifer, (iv) permitted water use and other relevant summary statistics. (MK)

31. Please provide a discussion (or reference) on the premine groundwater use (including the uses reported to SEO) within the permit boundary and the adjacent areas. (MK)

Mine Plan

32. Please provide an electronic copy of the groundwater model referenced in Addendum MP-3. In addition, please provide the GIS projection coordinate of the model files that will enable the LQD to plot the model results in GIS for the purposes of producing the CHIA (Cumulative Hydrologic Impact Assessment). The LQD review of the model files might potentially generate additional comments, clarifications or questions. (MK)

MP.1.1 Type of Mine

33. Page MP-1 states, "Below the Tongue River Member is the Lebo shale member of the Fort Union Formation which contains the Masters Seam (Cardno MM&A, October 2013)." This statement is not consistent with Table D5.3-1, Page D5-T1 and other descriptions in Appendix D5. Table D5.3-1 indicates Masters Coal seam is in the Tongue River Member. Please clarify and make appropriate changes throughout the submittal (Example: MP 4.4). (MK)

34. Major coal seams on the Brook Mine include: Dietz (1,2,3), Monarch, Upper Carney, Lower Carney and Masters.". Dietz (1,2,3) coal seam is not included in the description presented in Section D5.3.3.3, Appendix D5. Please clarify: (i) the

seams that will be mined by the Brook Mine and (ii) include the description of all the coals seams as appropriate in Appendix D5 and Appendix D6. (MK)

MP.5.8 Mine Pit Dewatering Plan

35. Consider using the groundwater model referenced in Appendix D-3 to provide a description for a range of estimates on anticipated dewatering rates/volumes and groundwater inflows to the mine pit. (MK)

36. Please clarify the anticipated effects of the faults on the dewatering plan or groundwater impacts during mining. (MK)

MP.5.9 Dewatering Wells

37. Please provide a brief discussion on the anticipated quality of groundwater removed at various stages of mining. (MK)

38. If groundwater is discharged into a stream channel, anticipated discharge flow rate, water quality, and estimated seasonal discharge of the groundwater should be tabulated. The availability and suitability of this water for downstream water users should also be evaluated. Please clarify if this is an expected mechanism to discharge pumped groundwater. (MK)

MP.5.8 Groundwater Rights

39. Please include a description on any expected degradation of groundwater quality caused by the mining operation (including lateral flow through spoils) in the adjudicated wells. (MK)

MP.6.2.Groundwater

40. Please provide a brief discussion on any hydrologic effects caused by anticipated changes in recharge to the aquifers during mining. (MK)

41. Please provide an assessment of any subsidence effects (Addendum MP-6) on the hydrologic system during operations. (MK)

42. Please discuss if there are any expected impacts on groundwater quality caused by subsidence. (MK)

MP.6.3.2 Plan to Mitigate the Impacts on Groundwater

43. If the quality or quantity of adjudicated water supplies are affected, then an alternative source should be identified as part of the mitigation plan. Please provide a statement to meet this statutory requirement (W.S. § 35-11-415(b)(xii)). (MK)

MP.7.2 Groundwater Monitoring

44. Please clarify the lack of any shallow monitor wells near Hidden Water Creek, Goose Creek and Tongue River alluvium and if this will be an impediment to completely characterize the groundwater impacts during mining. (MK)

45. Please clarify the possibility of any of the monitor wells shown in Exhibit MP.7-7 being discontinued due to any constraints in the proposed-mine plan (example: mined through). (MK)

MP.8 Water use

46. Page MP-47 states, "Industrial water will be obtained from groundwater wells or from water collected in sediment and flood control reservoirs." Please clarify if the groundwater wells mentioned in this statement are wells that will be exclusively used as industrial supply wells or if they are same as dewatering wells. (MK)

47. Page MP-48 states, "It is estimated that the total water use will be approximately 400 million gallons per year." Please provide a discussion comparing the reported water use by other mines of similar size in the Powder River Basin.

48. Page MP-48 states, "It is estimated that the total water use will be approximately 400 million gallons per year." Please provide a comparison of this estimated total water use against the various estimated water sources available during mining (Example: from dewatering wells). It will be very helpful to provide a discussion on contingency measures during extreme wet/dry years or if the proposed mine plan does not require extensive dewatering. (MK)

49. Please clarify if there is any expected variability in this projected water use (example: is it closely related to the mine plan). (MK)

Addendum MP-3 Groundwater Model

50. Page Addendum MP-3-19 states, "Since, most of the wells within the modeled domain are stock wells with intermittent pumping and completed in geologic strata below the Masters Coals, they are relatively inconsequential to the groundwater system modeled in this report." Please provide a Figure (or reference) to show these wells, their depths and discuss on why they are hydrogeologically isolated from the effects of the proposed mine. (MK)

51. Page Addendum MP-3-20 states, "The faults are significant in lateral extent and form natural no flow boundaries". Please provide a discussion (or refer to a discussion) on how these faults were determined to be no flow boundaries. (MK)

52. Please clarify the reason for not estimating vertical hydraulic conductivity of the interburden using an aquifer test. (MK)

53. Page Addendum MP-3-25 states, "With no unnatural stresses on the system ..." Please provide a discussion of the CBM impacts on the water levels. It appears that the hydrographs presented in Appendix D6 do not show the impacts of CBM. (MK)

54. There are two sub-sections for recharge, Section 2.5.3 and Section 2.6.1. Please clarify/consolidate. (MK)

55. Page Addendum MP-3-26 states, "... drain cells were placed in the model to simulate seeps from the outcrops." Please provide a discussion on the evidence for seeps (or reference) observed during field surveys. Were there any field data collected on the location and flow rates of these seeps? (MK)

56. Page Addendum MP-3-27 states, "River cells from MODFLOW's river boundary conditions package were placed in the model to simulate the Tongue River and Goose Creek." Please provide a conceptual discussion supported by field observations on the type/nature of interaction of these streams with groundwater (Gaining stream vs. losing stream). (MK)

57. Please provide a discussion on any contribution of groundwater baseflow to the major surface water bodies within the permit boundary. (MK)

58. In section 3.2 MODFLOW Input Files, was aerial recharge used as an input file? Please clarify if evapotranspiration was considered as a discrete input or lumped into net aerial recharge. (MK)

59. Page Addendum MP-3-31 states, "Layer 1 – represents the coal overburden". Please clarify if the alluvial aquifer was included in the model. Please provide justification for not considering the alluvial aquifer in the model. (MK)

60. Page Addendum MP-3-31 states, "Layer 3- Carney Interburden. This interval is generally of low to very permeability in the western portion of the Project Area". Please clarify how the areas where Layer 3- Carney Interburden is absent are treated in the groundwater model. (MK)

61. Please include a discussion of the thickness of *all* model layers. (MK)

62. Please include a justification for not considering the underlying zones beneath the Masters coal seam in the model. (MK)

63. Please provide appropriate cross section(s) of the model grid overlaid with the drill hole data collected during baseline characterization. This will help the

evaluation of the adequacy of model layer thicknesses against the stratigraphic field data. (MK)

64. Please clarify how the layers were modeled to represent the confined/unconfined aquifer types. (MK)

65. In addition to model calibration, please provide justification for the recharge rates applied in the model including any literature references. (MK)

66. Page Addendum MP-3-33 states, "Recharge is applied within the modeling software by applying the recharge to the highest active layer." Please clarify the presence of any modeled 'dry cells' in the model and the influence of applying the recharge to the layers below the dry cells. (MK)

67. Table 4.2-3. lists model porosity values. Typically, MODFLOW (flow model) does not use porosity in its calculations. Please clarify the need for this input parameter. (MK)

68. The faults are not modeled in Layer 1. Please clarify the procedure for determining the vertical extents of the faults in the model. (MK)

69. Please provide the input parameters used to model the horizontal flow barriers in the model and discuss their technical reasonableness. (MK)

70. Page Addendum MP-3-40 states, "As the current, post-CBM potentiometric surface is considered the static level....." Please provide the implications of this assumption, on the model calibration of hydraulic parameters and the mode predicted hydrologic impacts (over estimation of drawdown vs. underestimation) (MK)

71. It is noted that Table 4.7-1 summarizes the calibration residuals and statistics from the calibrated model. Please consider providing additional presentations of the calibrated model statistics. This will enable an easier evaluation of any spatial bias in the model calibration. (MK)
    a. X-Y plot of observed vs. simulated water levels.
    b. A map plotting the residuals to show the spatial distribution
    c. Provide a summary statistics table with Mean Error, Mean Absolute Error, Sum of Squared residuals for the calibrated model. It is noted that some of these values are presented in the sensitivity analysis. However, a compiled summary statistics table would be very helpful.

72. In addition, to the measured water levels, please clarify if there were any flow measurements used for model calibration. (MK)

73. Please provide a water budget table (in acre-feet per year or cubic-feet per day) showing all the inflows into the model and outflows from the model.

74. Please provide a comparison of model simulated inflows and outflows against conceptual estimates of inflows and outflows. This comparison will act as another verification/check for the technical adequacy of the groundwater model (Example model GHB flows vs. reasonable estimated conceptual flows). (MK)

75. Page Addendum MP-3-40 states, "Due to a system of thin aquifers with similar sources and sinks and homogeneous hydraulic conductivities, the head values of the steady-state model were nearly identical between the separate coal layers as noted in Table 4.7-1." Please clarify whether this statement implies that the interburden (where present) between the coal seams is not a confining unit. (MK)

76. In figures 4.7-1, 4.7-2 and 4.7-3, please consider including the observed/interpreted water level contours and the measured water level elevations. This will enable to visually evaluate the observed vs. simulated water levels. (MK)

77. Page Addendum MP-3-45 states, ".....and if CBM production ceases, recovery rates will likely be higher than estimated in the model." Please clarify if this statement implies that currently, there are CBM wells that are operational in the area and are pumping out groundwater. (MK)

78. Please consider removing the model sensitivity to storage coefficients and porosity. *Steady state* groundwater model equations do not include these parameters in any of the model calculations. (MK)

79. Please clarify if the faults in the model and their parameters were considered in any of the sensitivity analyses. If not, please consider performing a detailed and thorough sensitivity analysis, as the faults appear to influence the drawdowns simulated by the groundwater model. (MK)

80. In addition to the simulated drawdown maps, please consider providing hydrographs at strategically selected locations. This will enable a better presentation of the impacts over time. (MK)

81. Please clarify if the three wells listed in Table 4.9-1 are the only wells considered for the analysis. Also, provide a discussion on the methodology to narrow down the analysis from several wells shown in the groundwater rights maps to these three wells. (MK)

82. Please provide (or reference) a discussion about the three wells listed in Table 4.9-1, their depths, screened intervals and other pertinent information. (MK).

83. Page Addendum MP-3-60 states, " To measure the impacts to the Tongue River and Goose Creek, a series of targets were placed along these drainages in Layer

1" Please define the term target. Also, clarify if these targets are located in the alluvial aquifer. (MK)

84. Page Addendum MP-3-60 states, "These targets demonstrate that the estimated maximum impact to Tongue River Alluvium is conservatively estimated to reach 2.5 feet drawdown near the river." Please expand the discussion on the impacts to surface water flows including translating the drawdown to an estimated decrease in the groundwater baseflows to Tongue River and Goose Creek. (MK)

85. Please provide a statement on any hydrologic impacts predicted by the groundwater model to areas outside the Brook mine permit boundary. (MK)

86. Please provide a discussion on the simulated impacts caused by mining to surface water – groundwater interaction within the model domain. (MK)

87. Please compare the model simulated water balance between pre-mining, during mining and post mining conditions. Consider including a table that presents the water balance during select periods showing the flows from all sources and discharges to all the sinks within the model domain. Provide a detailed discussion addressing any changes in the model simulated water balance between pre-mining, during mining and post mining conditions. (MK)

88. In addition to the maps presented on the recovery estimates, please provide hydrographs at strategically selected locations. This will enable a better presentation of recovery over time. (MK)

89. The modeling documentation lacks discussion on the backfill aquifer. In the recovery model, please clarify how the model treats the backfill aquifer (spoils aquifer) and its resaturation. Please provide a discussion (or reference) to the hydraulic properties of the backfill materials used to create the backfill aquifer and the aerial extent of the backfill aquifer. (MK)

Addendum MP-6 Subsidence Control Plan

90. Figure MP6.1-1 shows "Monarch Seam Surface Only Mining". Please clarify if the Monarch seam is targeted for mining in the appropriate sections of Appendix D5, Appendix D6 and mine plan. (MK)

Reclamation Plan

RP 8.5.3 Groundwater

91. Section 8.3, page RP-38 states, "The estimated Postmine Potentiometric surfaces for the reclaimed aquifer for the Masters and Carney Seams are presented respectively in Exhibit RP.8.3 and Exhibit RP.8-4. Please provide a summary comparing and contrasting the premine potentiometric surfaces vs.

post mine potentiometric surfaces. This comparison should also consider any changes in the hydraulic properties (hydraulic conductivity, storativity, recharge capacity) of the premine aquifers vs. post mine aquifers. (MK)

92. Please discuss any changes in the interaction between the surface water and groundwater systems from the premining through the postmining phases of the operation. (MK)

93. Please discuss the intersection of the postmining topographic and potentiometric surfaces and their effects on the location and size of groundwater-fed water bodies. (MK)

94. Section 8.5.3, page RP-46 states, "These water quality changes can be qualitatively predicted from the overburden mineralogy and projected post mine hydrology." Please expand this discussion on projected groundwater quality. Provide a discussion on the estimated/ projected post mining groundwater quality. A detailed description of potential changes in water quality from flow through backfill/mined out areas should be included. Any potential changes to water quality in adjacent aquifers should be discussed with respect to the potential for offsite material damage. (MK)

95. Please provide a discussion on any anticipated water use during the reclamation period. (MK)

96. Please address (or reference) any expected post-reclamation subsidence effects on the hydrologic system (both quantity and quality) and the plan to minimize these effects. (MK)

To: File, BROOK MINE COAL PERMIT APPLICATION, TFN 6 6/025

Re: Round 1 Comments

From: **Wyoming Game and Fish Department**

Date: March 12, 2015

The Wyoming Game and Fish Department was asked to review the Brook Mine Coal Mine Permit Application, Wildlife Section (Appendix D9) on November 26, 2014. Their response was received on Friday, March 13, 2015 via email. The original letter is attached to this memo.

The comments from Game and Fish were as follows:

1. We recommend this report become part of the annual reporting which will ensue throughout the operation of the mine.

2. We suggest coordinating with the USFWS regarding raptor mitigation as needed through the mining process.

3. We recommend mining reclamation practices consider providing suitable habitat for existing wildlife within the specifications required by DEQ-LQD.

End of comments from Wyoming Game and Fish.

WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4699

wgfd.wyo.gov

March 12, 2015

WER 273.01b
Intermountain Resources
Ramaco, LLC.
Wildlife Baseline Data Report
Brook Coal Mine Permit Area
Sheridan County

Bjarne J. Kristiansen
Department of Environmental Quality
Land Quality Division
2100 West 5th Street
Sheridan, WY 82801

Dear Mr. Kristiansen:

The staff of the Wyoming Game and Fish Department has reviewed the Wildlife Baseline Data Report for the Brook Coal Mine Permit Area from Intermountain Resources on behalf of Ramaco, LLC in Sheridan County. We offer the following comments for your consideration.

We have reviewed the baseline wildlife data provided by Intermountain Resources and completed for the Appendix D9. We find the information adequate and collected in a manner consistent with typical coal mine reporting procedures. We recommend this report become part of the annual reporting which will ensue throughout the operation of the mine. We suggest coordinating with the USFWS regarding raptor mitigation as needed through the mining process. We recommend mining reclamation practices consider providing suitable habitat for existing wildlife within the specifications required by DEQ-LQD.

Thank you for the opportunity to comment. If you have any questions or concerns, please contact Scott Gamo, Staff Terrestrial Biologist, at 307-777-4509.

Sincerely,

John Kennedy
Deputy Director

JK/mf/ns

cc: USFWS
Paul Mavrakis, Sheridan Region
Tim Thomas, Sheridan Region
Lynn Jahnke, Sheridan Region
Jeff Baron, WWC Engineering